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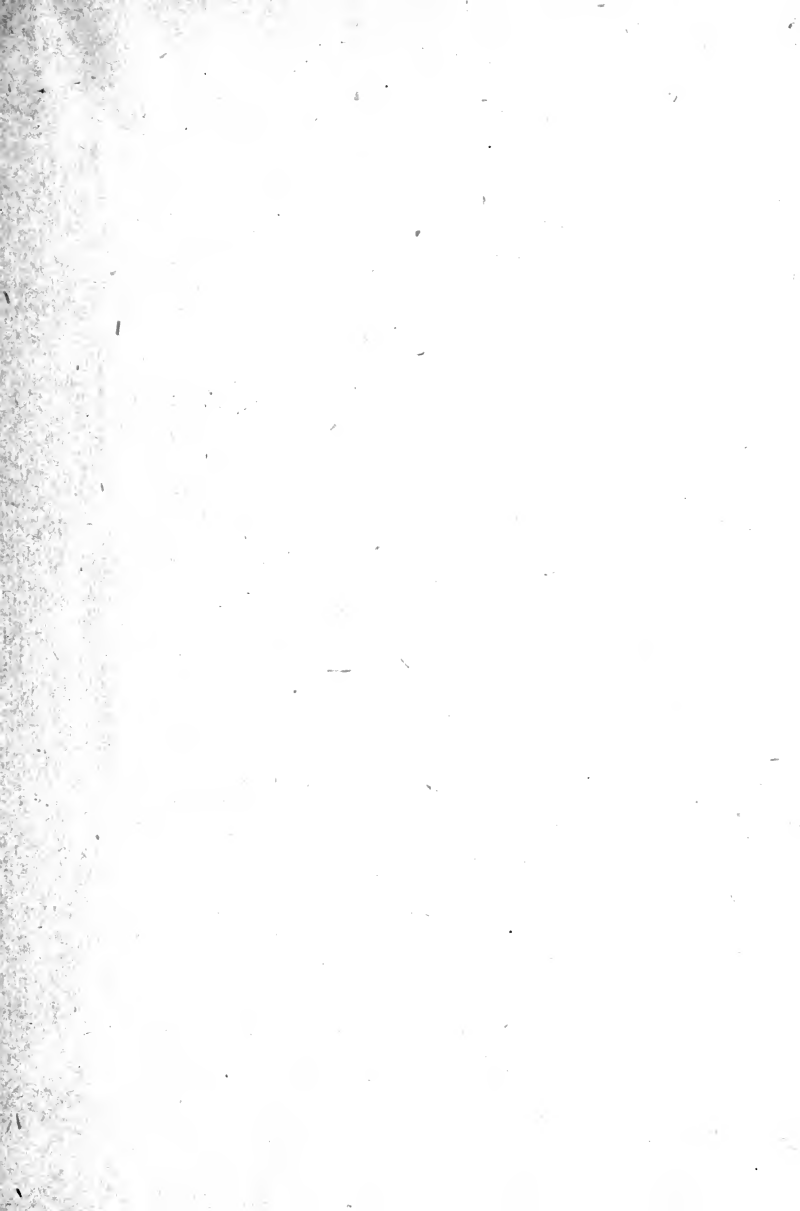
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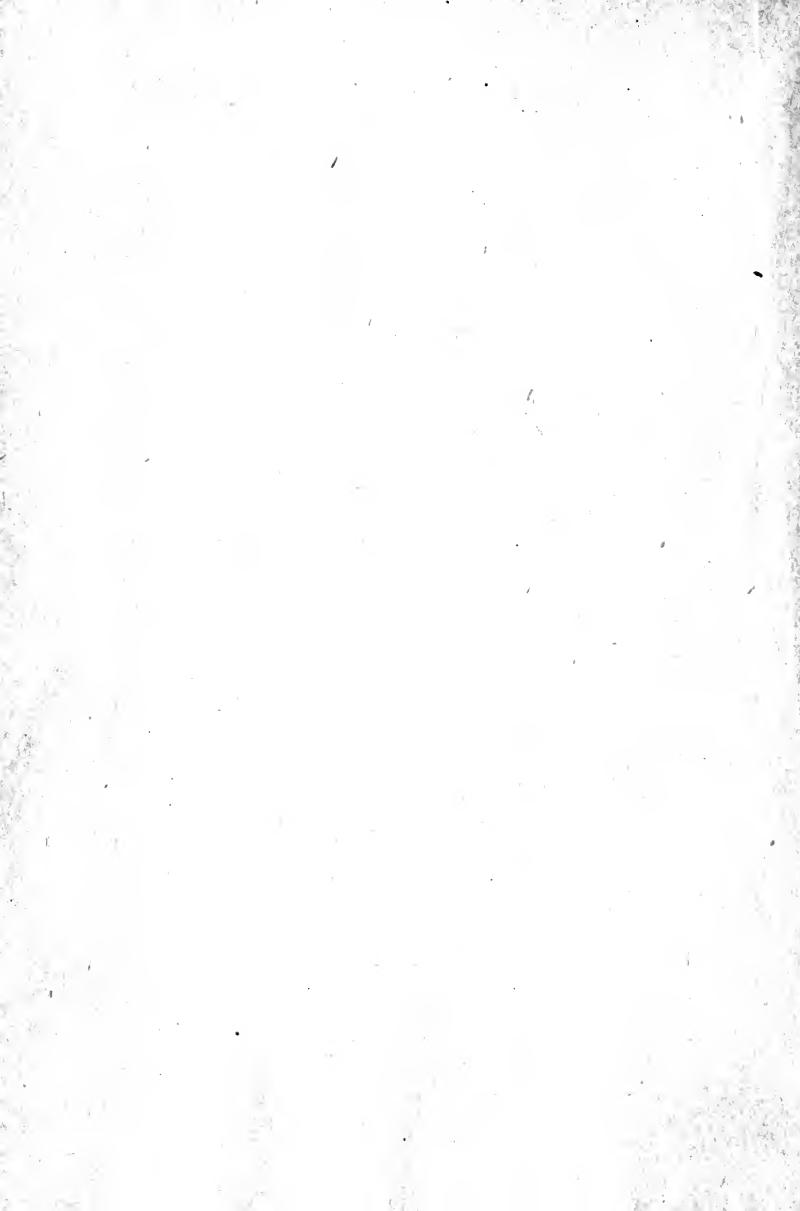
**ATTACK and DEFENSE
OF
FORTIFIED HARBORS**

By
CAPT. ARTHUR P. S. HYDE

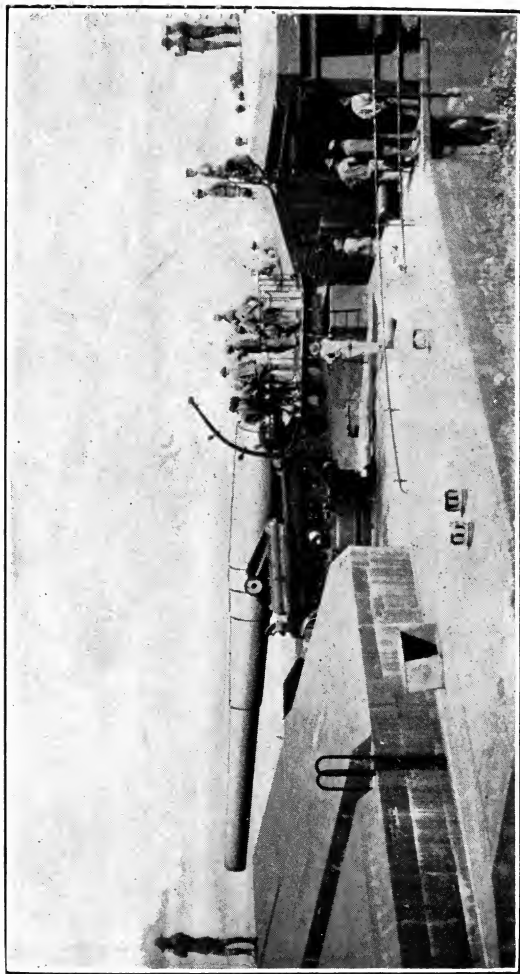
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A 12-INCH GUN ON BARBETTE CARRIAGE.

[Frontispiece.]

ATTACK AND DEFENSE

OF

FORTIFIED HARBORS

BY
CAPTAIN ARTHUR P. S. HYDE

Coast Artillery Corps, United States Army
Inspector-Instructor of Coast Artillery Militia,
National Guard of Washington

Second Edition

FRANKLIN HUDSON PUBLISHING CO.,
KANSAS CITY, MISSOURI, U. S. A.

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PREFACE TO FIRST EDITION.

The subject-matter contained in the following pages was published originally as a series of articles appearing in the *Seattle Daily Times* in January and February, 1914, prepared at the request of the managing editor of the *Times*. The interest displayed in these articles by officers of the Coast Artillery Reserve Corps, together with a desire on their part to make a careful study of the important subject of the attack and defense of fortified harbors, has led to a revision of the material and its publication in its present form.

I desire to acknowledge my indebtedness to Major Howard A. Hanson, C. A. C., N. G. W., for much valuable assistance rendered in the revision of these papers, and to Captain C. B. Blethen, C. A. C., N. G. W., for many courtesies in connection with the publication of this book.

ARTHUR P. S. HYDE.

The Adjutant-General's Office,

SEATTLE, WASH., October 5, 1914.

PREFACE TO THE SECOND EDITION.

A desire to put the subject-matter of this work in a more readable form than the first edition, which was printed from newspaper type and issued as a pamphlet, has led to a general revision of the entire book.

Events of the great European war have transpired since the earlier edition, involving the attack upon coast fortifications and their defense. Although the information thus far available concerning these operations is very meager, yet enough has been made public to emphasize some of the fundamental principles of the attack and defense of fortified harbors enunciated in the following pages.

In presenting this edition to the public, I desire to express my appreciation to Captain Clarence B. Blethen, Field Artillery, N. G. W., for the originals of the illustrations with which the book is embellished, taken from the files of the *Seattle Daily and Sunday Times*, to which free access was accorded me.

ARTHUR P. S. HYDE.

The Adjutant-General's Office,

SEATTLE, WASH., December 1, 1915.

STATE OF WASHINGTON
MILITARY DEPARTMENT

OFFICE OF THE INSPECTOR-INSTRUCTORS
612 HAIGHT BUILDING

SEATTLE, January 21, 1916.

From: Captain Arthur P. S. Hyde, C. A. C.

To: The Adjutant General of the Army.
(Through The Chief, Division of Militia Affairs.)

Subject: Approval of revised edition of "Attack and Defense of
Fortified Harbors."

1. I have recently revised the book entitled "Attack and Defense of Fortified Harbors," written by me, and have had it accepted for publication by the Franklin Hudson Publishing Company, of Kansas City, Missouri.

2. Since the work was completed and has been in the hands of the printer, it has been suggested to me that, in view of the fact that certain incidents in connection with the European War are mentioned as illustrating principles enunciated, the provisions of G. O. No. 10, War Department, 1915, might apply. Personally I do not think the statements made come within the restrictions imposed in that order, but in order to assure myself of the approval of the War Department, I am transmitting herewith complete proof-sheets of the book together with illustrations, with the request that the Department pass definitely upon the book and indicate what, if any, passages should be omitted.

10 Inclosures.

ARTHUR P. S. HYDE.

1st Indt.

O 62.13

War Department, Divn. Militia Affairs, O. C. S., February 2, 1916.
To The Adjutant General.

1. The proof of Captain A. P. S. Hyde's "Attack and Defense of Fortified Harbors" has been read in this office. The proposed book is purely technical in nature and it is not believed that General Orders, No. 10, War Department, 1915, was intended to apply in such cases.

2. It is recommended that Captain Hyde be informed that there is no objection to the publication of his work.

A. L. MILLS,
10 Inclosures. Brig. Gen., G. S., Chief of Divn.

Approved as recommended in 1st Indt.

By order of the Secretary of War:

TASKER H. BLISS,
Major General, Chief Mobile Army Div.
For Chief of Staff.

2366096

2nd Indt.

War Dept., A. G. O., Feb. 5, 1916. — To The Chief, Division of Militia Affairs, inviting attention to the approval of the Secretary of War indorsed on this page.

10 Inclosures.

W. M. WRIGHT,
Adjutant General.

3rd Indt.

O 62.13

War Dept., Divn. Militia Affairs, O. C. S., Feb. 7, 1916.
To The Adjutant General. Noted.

10 Inclosures.

2366096

4th Indt.

War Dept., A. G. O., Feb. 9, 1916. — To Capt. Arthur P. S. Hyde, Coast Artillery Corps, Inspector-Instructor, care Adjutant General, State of Washington, Olympia, Wash., inviting attention to the preceding indorsements hereon, and to the approval of the Secretary of War indorsed on page 2.

By order of the Secretary of War:

10 Inclosures.

W. M. WRIGHT,
Adjutant General.

Attack and Defense of Fortified Harbors.

CHAPTER I.

GENERAL PRINCIPLES OF COAST DEFENSE.

PERMANENT WORKS.

Permanent fortifications exist for the purpose of defending the frontier of a State against invasion on the part of the armed forces of other States. These fortifications are divided into two general classes—depending upon their location—known as land defenses and coast defenses.

On the Continent of Europe, where States differing materially in nationality, race, and institutions border upon one another, all maintaining large standing armies, it is very necessary that the lines, often imaginary, which separate them should be thoroughly defended by permanent works. England, on the other hand, being an island kingdom, has no land frontiers, and her first line of defense is therefore her seacoast.

In our country the conditions differ from both the Continent of Europe and Great Britain. While we have land frontiers to the north and south of us, the bordering countries do not maintain great standing armies, and it is hardly to be expected that our territory would be subject to invasion from either direction. As a matter of fact, our treaty relations with Canada forbid the maintain-

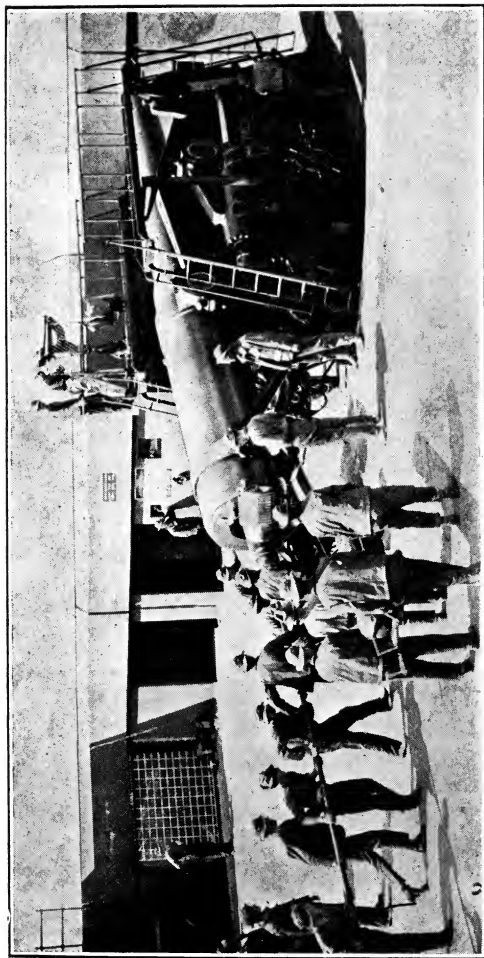
ing of armament upon the Great Lakes and, by inference, along the land frontier. It may therefore be said that the only direction we may reasonably look for a possible invasion in time of war is from across the seas. Thus it would appear that the only frontier which must be defended by permanent fortifications is our coast line.

CONTINUOUS COAST DEFENSES IMPRACTICABLE.

The question therefore is, How can adequate defense be attained? It is manifestly impossible to establish a continuous line of fortifications, so the important harbors, commercially or strategically, or both, have been selected to be fortified.

Our permanent system of coast defense is the result of careful study by a coast defense board, known as the Endicott Board, appointed during the first administration of President Grover Cleveland, and which took its name from Secretary of War William C. Endicott, its president. This board visited all important points on our seacoasts from Eastport to Brownsville and from Blaine to San Diego, and as the result of careful study of the situation, recommended the harbors which should be provided with permanent fortifications and the character of the armament to be installed in each.

Although this board met nearly thirty years ago, it is interesting to note that the system outlined by it has been followed nearly to the letter. A few changes have been made—such, for example, as the establishment of a chain of forts on the islands across the entrance to Long Island Sound, instead of fortifying the harbors of the Sound cities of New London and New Haven, and the elimination of all floating batteries.



LOADING A 10-INCH GUN ON DISAPPEARING CARRIAGE.

Journal of Management Education 30(6)

A few years ago a similar body, known as the Taft Board (headed by Secretary of War William H. Taft), again studied the situation, and recommended some slight revisions. The defensive scheme, as outlined by the first and modified by the second board, has been practically completed, with the exception of the fortifications at the entrance to Chesapeake Bay and at San Pedro (the port of Los Angeles).

In addition, our territorial expansion which resulted from the Spanish War and the construction of the Panama Canal have made necessary the erection of permanent works of the strongest character for the defense of Manila and Subic Bays in the Philippine Islands, Honolulu and the great naval base at Pearl Harbor in the Hawaiian Islands, the Canal Zone, and the naval station at Guantanamo, Cuba. The construction of these works has been pushed with vigor and they are to-day nearly completed.

FORTIFIED HARBORS.

The harbors selected for permanent coast defenses within the continental limits of the United States are as follows:

On the Atlantic Coast: the mouth of the Kennebec River, Portland, Portsmouth, Boston, New Bedford, Narragansett Bay, the eastern entrance to Long Island Sound, New York, the mouth of the Delaware River, Baltimore, the Potomac River, Hampton Roads, the mouth of the Cape Fear River, Charleston, Port Royal, Savannah, and Key West. Of these, the defenses of Baltimore, the Potomac River, and Hampton Roads will be rendered of secondary importance upon the completion of the fortifications at the entrance to Chesapeake Bay. The defenses

of Port Royal were erected for the protection of the naval station at that place. Since the virtual abandonment of this station by the Navy Department, the coast artillery garrison has been withdrawn and the importance of the defenses greatly decreased. While forts and batteries have been built and guns emplaced at the mouth of the Kennebec River, no garrisons have ever been provided.

On the Gulf Coast the fortified ports are: Tampa, Pensacola, Mobile, the mouth of the Mississippi River, and Galveston.

On the Pacific Coast they are: Puget Sound, the mouth of the Columbia River, San Francisco, Los Angeles (San Pedro), and San Diego.

LOCATION OF COAST FORTIFICATIONS.

Having selected the harbors to be defended, the next question to arise is, How shall the defenses be located? On this point there has been quite a change of thought in recent years, so that many of the defenses constructed more than ten years ago are not disposed in accordance with the latest and best strategical and tactical ideas.

It is manifest that the answer to this question is to be found in a consideration of the problem of how best to meet the possible forms of attack that may be brought against the defenses.

CLASSES OF ATTACK.

Coast defenses are subject to three general classes of attack—viz., from the sea, from the land, and from the air; and of course it necessarily follows that any two or more of these forms may be combined. As a matter of fact, the latter undoubtedly would be the situation in the event of a determined attack on our coast defenses. Un-

fortunately, little or nothing has been done in the way of providing land defenses for our forts. We are exceptionally well defended, in so far as the sea fronts are concerned—so well, in fact, that we may safely say it would be impossible for our forts either to be reduced by bombardment by a hostile fleet or rendered untenable, due to attack by sea alone.

Bombardment.

There are several forms of operations that are open to an attacking fleet. For example, vessels may lie at nearly extreme range and bombard the forts, with a view to disabling guns and fire-control stations and to produce such demoralization among the *personnel* as may be possible. This method never promises decisive results, as was amply demonstrated in the early stages of the Dardanelles campaign.

"Run Past."

Again, the fleet may attempt to "run past" the forts. We often hear this spoken of as a probable form of attack, due possibly to the fact that during the Civil War Admiral Farragut gained great prominence by his successful engagements at the mouth of the Mississippi River and Mobile Bay, in both of which cases the form of attack used was the "run past."

Conditions have changed greatly in the last fifty years. In our day armored ships are very costly to build and require considerable time—two or three years being needed for the construction of a single battleship, each vessel representing an expenditure of from \$15,000,000 to \$20,000,000. It is manifestly inadvisable to risk the loss of a ship representing such an enormous outlay and requiring such a length of time to construct, unless an adequate re-

turn is gained. Such a return is impossible of achievement in that manner—a “run past.”

A concrete example is always clearer than a purely abstract one. We will therefore assume that the United States is engaged in a war with China, and that the Chinese fleet has appeared in the Strait of Juan de Fuca. The objective of that fleet would be two-fold—viz., the capture of the great commercial cities of Puget Sound, to lay them under tribute, and the naval station at Bremerton, as a base of operations. It would be of the utmost importance to the Chinese admiral that he immediately obtain a suitable base with all the necessary facilities for refitting the fleet.

If he should succeed in running past the forts at the entrance to Puget Sound, he would find his fleet effectually bottled up, because we would still hold the forts, which are the key to the entire situation. To all intents and purposes, therefore, Seattle is an inland city, one hundred and fifty miles from the ocean. It can thus be seen that before the capture of Seattle, Tacoma, or the Navy Yard is possible, or before they can be put to a practical use by the enemy, it is absolutely essential that he first shall have reduced and taken possession of these forts. Thus it is manifest that a “run past” would subject the vessels of the fleet to very grave dangers without the accomplishment of any good.

Commenting upon the folly of a “run past,” even if successfully accomplished, the *Naval and Military Record* (English) says:

“As many mice have learnt to their cost, it is one thing to get into a trap and quite another to get out.”*

**Journal of the United States Artillery*, September-October, 1915, p. 234.

It was an interesting fact, disclosed at the time of the surrender of Santiago, Cuba, that "prior to the declaration of war there was not a single modern gun at the mouth of the harbor; nothing but obsolete ordnance, nearly every piece of which was more than a hundred years old."*

Even the few rifled guns which were mounted after the beginning of the war were, for the most part, antiquated weapons, removed from the obsolete cruiser, *Reina Mercedes*, which was in the harbor at the outbreak of hostilities. And yet, with this very inferior armament, Admiral Sampson did not dare risk the loss of any of his armored ships by forcing an entrance into the harbor, so long as the Spanish fleet was still afloat.

Every armored ship needlessly lost in war is virtually a gain of two for the enemy.

There is one condition of an attack, however, under which a "run past" might be justifiable; that is the sending in of a raiding expedition consisting of small craft for the purpose of destroying some specific place, or to create a certain amount of demoralization among the inhabitants of the country. It is therefore necessary to consider the possibility of this form of attack in making our dispositions for the defense of a harbor.

Aërial Attack.

While there have apparently been no operations against the coast fortifications during the present war in Europe involving the use of aërial fleets, yet the ease with which dirigibles have been able to drop bombs in various cities of England and on the Continent would seem to indicate a certain value for this purpose. The military

*Sargent, "Campaign of Santiago," Vol. I., p. 222.

value of both the aëroplane and the dirigible has become so definitely established in the course of the present war that they must certainly be reckoned with in connection with our system of coast defense. Like a bombardment from the sea, however, a purely aërial attack must of necessity prove barren of decisive results.

Combined Land and Naval Attack.

The form of attack that would undoubtedly produce the best results from the point of view of the invading force would consist of a combined land and naval attack. In all probability the fleet would lie just within extreme range, and open fire on the forts for the purpose of keeping the artillerymen at their posts. In the meantime a land force would undertake a determined attack on the land front of the forts.

Aëroplanes of a suitable type would unquestionably be utilized for reconnaissance purposes, and these, with the possible addition of dirigibles, might actually participate in the attack upon the forts.

VALUE OF SMALL ISLANDS.

It is manifest that if our fortifications are situated on small islands, there is no land front, and hence such forts are well-nigh impregnable. Thus, as stated before, *the latest and best thought in the matter of coast defense involves, wherever it is practicable, the location of the forts on small islands*, which virtually have no land front at all, and where the enemy must cross a water area before he can effect a landing.

There is no more easily defended line than a shore line, and no more difficult one to attack, as the water offers absolutely no protection for the troops advancing

in open boats. These facts were brought out and emphasized most clearly in the landing of the British troops upon V Beach at Sedd-el-Bahr in the Dardanelles campaign. In spite of the clever stratagem resorted to in the use of the old ship, *River Clyde*, apparently abandoned and drifting aimlessly ashore, yet containing, like the famous wooden horse of Troy, the forces of the invader, it was still necessary to advance over some twenty yards of open water, where no protection whatever could be had. Although the landing was effected, the losses were terrific—exceeding two-thirds of the strength of the command, and out of all proportion to the very meager results achieved.

The use of small islands for the location of coast defenses has received its greatest development in the solution of the problem for the defense of Manila Bay, where all the forts are situated on a chain of islands stretching across the mouth of the bay. Of these, El Fraile is a mere rock, rising but a few feet above the water. Its armament consists in 14-inch guns mounted in turrets on the same principle as the guns of a battleship and 6-inch guns mounted in casemates. The other islands, Corregidor, Carabao, and Caballo, rise precipitously from the water, and an effective landing upon them by attacking troops would be well-nigh impossible. Even though a landing might be effected, the attack itself would prove as fruitless and as disastrous as the British attacks upon the Gallipoli Peninsula in the Dardanelles campaign.

COAST DEFENSES OF PUGET SOUND.

The defenses of Puget Sound proper consist of Forts Worden, Flagler, and Casey. Fort Worden is situated on the headland forming the northeast extremity of the Quimper Peninsula. Fort Casey is situated on Admiralty Head, Whidby Island, an island so large as to be, to all

intents and purposes, a portion of the mainland. Fort Flagler occupies the northern end of Marrowstone Island, of sufficiently small area to come within the latest idea of coast fortification. Fort Worden has a very large land front to defend; so has Fort Casey. To defend either of these forts from the land side would require a considerable number of men and more or less permanent works. On the other hand, it would be a comparatively simple matter to prevent an invading army from landing on Marrowstone Island; therefore Fort Flagler is decidedly the easiest to defend against land attack.

The situation might even be conceived to arise that Forts Worden and Casey would succumb to a combined land and naval attack; but in this event Fort Flagler would remain in action, and would present the original problem to the commander of the attacking force. Of course, there is this handicap that must be considered: it would be possible to turn some of the guns and certainly the mortars of Worden and Casey on Flagler, unless our gunners were able to destroy them before the evacuation of these forts.

Still, it is naturally within the range of possibility, or even of probability, that Flagler could hold out for an indefinite period after Worden and Casey had succumbed, and so the Sound would still be bottled up. This illustrates the great advantage of fortifications being situated on small islands—in fact, there are well-informed officers who believe that all of the Puget Sound coast defenses should be concentrated at Fort Flagler.

SUMMARY.

To summarize, it is apparent that it is impossible to fortify the entire coast line. The points selected for per-

manent fortifications are those of importance from a commercial or strategic point of view, and often from both. In locating the fortifications themselves, we are governed by the possible form of naval attack to which they may be subjected. These, we have found, would be the bombardment, a "run past," an aërial attack, or a combined land and naval attack; the only one of which that promises any degree of success being the last named. Consequently the disposition of our defenses should be made with a view to resisting such an attack. This manifestly can be done to best advantage by the location of the fortifications upon small islands, where they will have no land front.

CHAPTER II.

NAVAL ATTACK.

KINDS OF NAVAL ATTACK.

Several methods of attack are open to the choice of the commander of the hostile fleet, but it may be laid down as a general principle that *the method to be adopted will be that which will promise the greatest dispersion of the fire of the forts.*

“Run Past.”

For example, assuming that he has decided to undertake a “run past,” which form of attack, for reasons already stated, is not promising of decisive results, it would be the height of folly for him to send in one ship at a time, upon which every gun of the coast defenses could be concentrated. His formation, therefore, would be such as to give him the greatest opportunity to bring into action the maximum number of guns, at the same time forcing the defenders on shore to scatter their fire.

It is safe to say that, without an adequate landing force, the only form of attack that could promise any degree of success would be a “run past,” following upon a determined and long-continued bombardment. However, for reasons already stated, such a form of attack would not be good strategy.

Should it, however, be undertaken, a dark night would be chosen—preferably one when the advantage of

darkness would be further accentuated by the presence of fog or a heavy mist, because a fog quickly absorbs searchlight beams and renders them entirely non-effective; in fact, it has been demonstrated in joint Army and Navy coast defense exercises that the use of searchlights on a foggy night is a positive aid to the attacking fleet, for the reason that, while valueless to the defense, their presence is made manifest to the attackers, who are thereby enabled to orient themselves with some degree of accuracy. The preliminary operations would involve a dragging of the mine-fields, with either the cutting of cables or destruction of the mines. Then, under cover of the thick weather, the fleet would be disposed in two or more columns, and the "run past" attempted.

It is quite reasonable to argue that under these circumstances the attack would be successful, in so far as getting the fleet past the forts would be concerned; but, after all, the forts would be still in our possession, the fleet would be bottled up in the Sound, and little good would have been accomplished.

There is another manifest disadvantage in this form of attack. While the thick weather would be very beneficial in covering the movements of the fleet, and possibly in preventing detection of such a movement from the shore, yet the complications involved in the matter of navigation must be apparent even to a layman. With the changes of course that are necessary in coming in from the strait until well past Fort Flagler, the skill of a captain or pilot thoroughly familiar with these waters and handling but a single vessel is often taxed to the utmost; in fact, it is no uncommon thing for vessels regularly engaged in the Sound trade to go ashore in thick weather on

Point Wilson, Point Hudson, or Marrowstone Point, all in the vicinity of Forts Worden and Flagler.

The difficulties encountered by a single vessel navigating in thick weather and with all the regular aids to navigation would be immensely increased by the numerous vessels of the fleet and the fact that the usual aids to navigation would be no longer available in time of war. The danger involved in the loss of vessels by collision or grounding would be so great as to make this form of operation almost prohibitive.

Blockade.

A blockade, while not a form of naval attack, is yet a recognized phase of naval operations against a fortified port. The object to be gained is to prevent vessels either entering or leaving the port. Any vessel attempting to do so, regardless of its nationality, is subject to capture or destruction. As vessels of a neutral nation may be involved, it has become a definite principle of international law that *a blockade, to be recognized, must be effective.*

The vessels of the blockading fleet would therefore be so disposed as to best observe the entrance and to take such effective measures as circumstances might demand in the event of an attempt to run the blockade. While operations of this character often involve an interchange of shots between the fleet and the shore defenses, yet, as a general rule, the blockading vessels will be beyond extreme range, especially in clear weather and in daylight.

At the time of the blockade of Cervera's fleet in Santiago harbor, the American fleet was stationed off the mouth of the harbor. In the daytime the various vessels cruised up and down the coast, one or more being left to

guard the entrance. At night the vessels were disposed in the form of a semicircle, the center of which was Morro Castle. Each ship directed its searchlights fixedly on the entrance to the harbor, so that any vessel which might attempt to escape would be immediately and brilliantly illuminated.

It is a fixed and definite principle of naval warfare that *no admiral would dare risk the loss of one of his armored ships without obtaining an adequate return in the matter of destruction inflicted upon the enemy.*

It may therefore be taken for granted that whatever preparatory formation the Chinese admiral would take in an attack upon the coast defenses of Puget Sound would be such as to give him adequate protection from a sortie on the part of our naval forces, as well as ample warning of any such attempt.

Bombardment.

A bombardment is a form of attack in which a heavy and destructive fire is opened by the ships of the fleet against the shore defenses, with the object of silencing the guns, destroying fire-control stations, searchlights, and other elements of the auxiliary defense, and setting fire to anything of an inflammable nature in the forts.

While the effect of a bombardment may be to a considerable extent demoralizing to the personnel, it can never be relied upon, unsupported by a land attack, to effect the reduction, surrender, or evacuation of the fort.

During the Spanish-American War there were several engagements between our fleet and the Spanish coast defenses; none of these proved effective until the combined land and naval attack at Santiago de Cuba forced Cervera's fleet to leave the harbor, only to be destroyed in a

purely naval engagement, and resulted in the fall of the city to American arms.

The attack by Admiral Sampson's fleet upon the defenses of San Juan, Porto Rico, May 12, 1898, resulted in the heaviest loss of life that our Navy sustained in the entire war, and yet the results obtained from the bombardment (which lasted practically all day), from a military point of view, were *nil*.

A very few years after the Spanish-American War the writer was stationed at San Juan, and actually had difficulty in discovering any evidences of Sampson's bombardment. His attention finally was directed to a hole left by a three-pounder shell in the brick wall of the officers' quarters at Fort San Cristobal, from which the projectile had recently been removed by a relic-hunter.

It is true that one corner of the infantry barracks had been destroyed by a bursting shell, and a few small buildings in the city beyond had been wrecked, but as far as any effect upon the fortifications in the way of their reduction was concerned, they stand to-day as they have stood for the last three centuries—impregnable to a purely naval attack.

It may be of interest to state that these fortifications are of masonry, following the Vauban or bastion system. The armament, however, was modern, comprising 15-centimeter Hontoria guns and 24-centimeter mortars.

Having learned that the Spanish fleet was not in San Juan harbor, and realizing the ineffectiveness of a continued bombardment without the coöperation of an adequate landing force, Admiral Sampson proceeded elsewhere in search of Cervera.

A form of bombardment for which there are numerous historic precedents, and therefore very likely to be

adopted, would be for the vessels of the fleet to be disposed in one or more columns, steaming in loops at nearly extreme range, so as to reduce the effectiveness of the fire from shore. As each vessel would arrive at a prearranged point in the circumference of the loop, a broadside would be fired at the batteries of the nearest fort.

It is easy to understand the demoralizing effect of a rain of several tons of steel bursting in the immediate vicinity of the batteries; yet something more than demoralization of the garrison is required to secure the surrender or evacuation of a coast-defense fort. The same principle obtains in the attack of a fort as applies on the field of battle: there must not only be a superiority of fire long sustained, but there must be a body of good infantry, or troops serving as infantry, who can carry the position at the point of the bayonet.

The gun crews in the disappearing batteries, however, are as well protected as is possible, and as long as casualties can be kept down, they doubtless would become accustomed quickly to being the target of the fleet.

As already stated, the damage that can be accomplished by such a fire against coast fortifications is not such as to disable the batteries.

Reconnaissance in Force.

Another form of attack, similar to a bombardment, is the reconnaissance in force. In this case the fleet would lie at about extreme range and open fire on the forts, with a view to drawing their fire in return, and thus disclose the position of the various batteries.

A reconnaissance in force at night is conducted under exactly similar circumstances, but has for its object more especially the determination of the location of all search-lights.

AERIAL ATTACK.

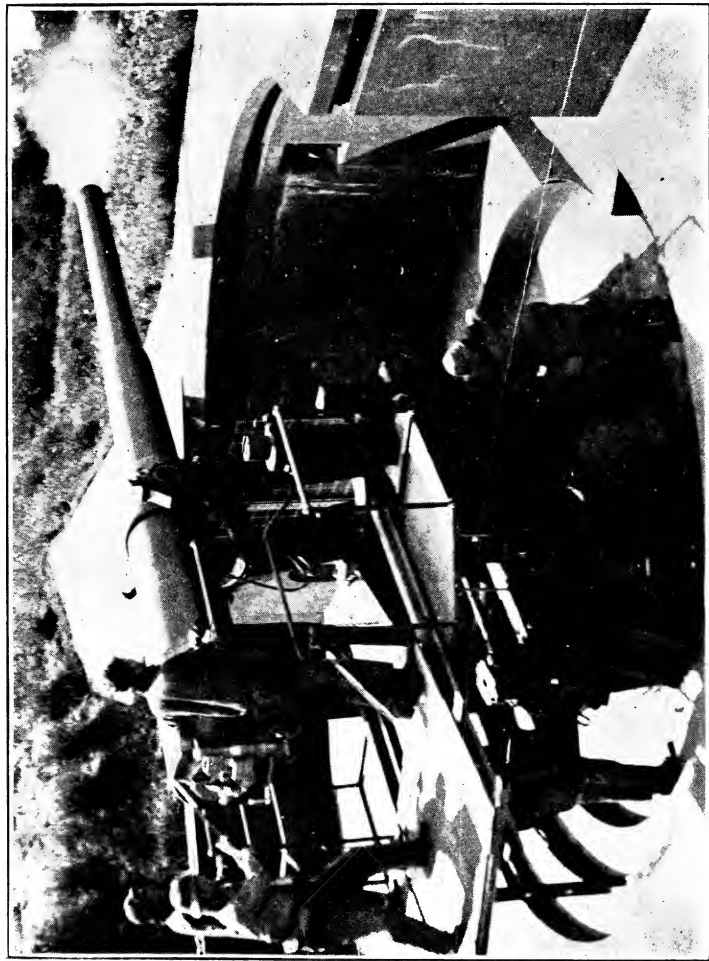
Closely allied to a bombardment from the sea is an aerial attack. This would be conducted by such air-craft as would accompany the expedition, and would consist of the dropping of bombs into the fortification, with a view to destroying or rendering unserviceable the guns and other means of defense, demoralizing the personnel, and setting fire to buildings of an inflammable character. As far as accomplishing any decisive results is concerned, they are impossible of attainment from an aerial attack unsupported by a large landing force.

PROBABLE FORM OF ATTACK.

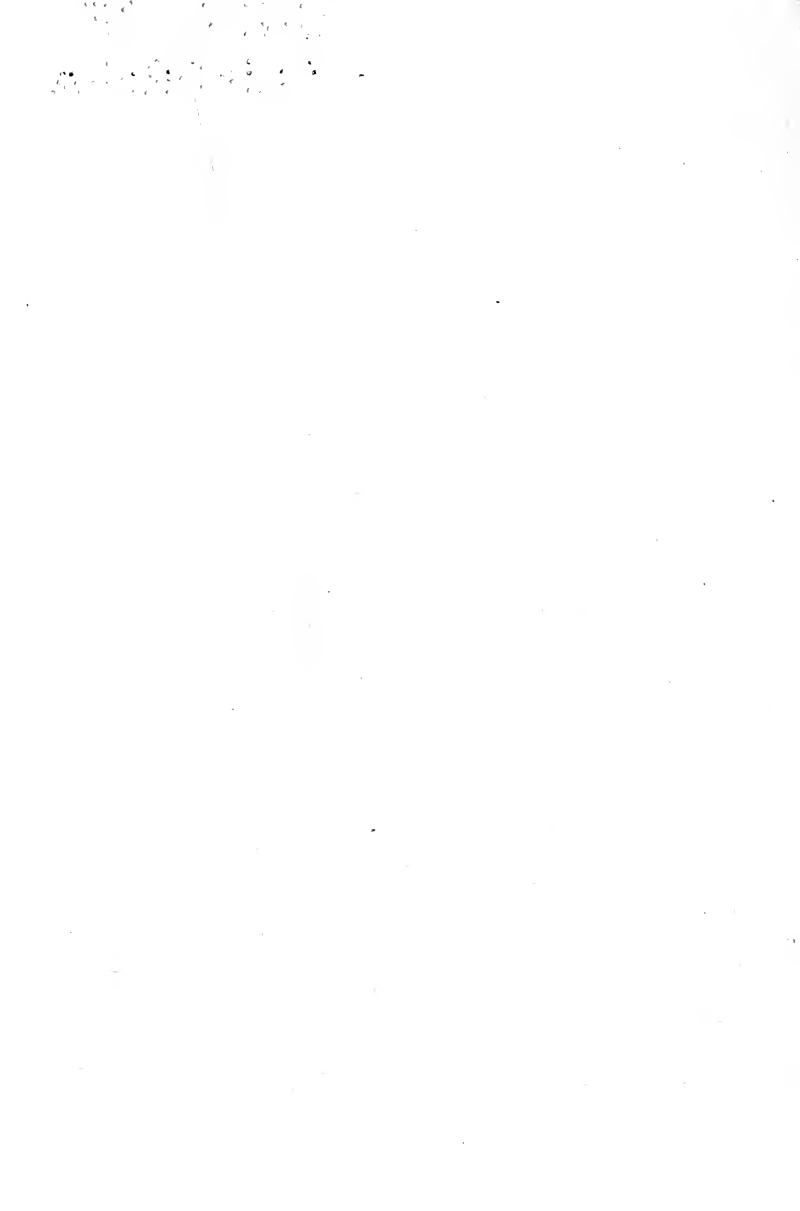
It is highly probable that in an attack on the coast defenses of Puget Sound, the first phase of the action would involve a bombardment; this for the double purpose of developing the strength and location of the defenses, and of causing as much damage as practicable. This would be followed up by a similar bombardment or, more properly, reconnaissance in force, at night, for the purpose of disclosing the number and location of all searchlights. Having obtained the desired information, it is highly probable an attack would be made by small landing parties under cover of darkness, to disable or destroy outlying searchlights and fire-control stations, with a view to seriously crippling the defense as a preliminary to the general action, of whatever form might have been determined upon.

VULNERABILITY OF STATIONS.

There is one feature of the defenses that is somewhat vulnerable—namely, the fire-control stations, without the use of which the fighting of the batteries would be greatly



A 6-INCH GUN ON A DISAPPEARING CARRIAGE, FIRING WITH SUB-CALIBER AMMUNITION.



handicapped, and mortar batteries would be virtually put out of action, so dependent are they upon the fire-control equipment.

This vulnerability of stations is the more deplorable because, in the majority of instances, it is so absolutely unnecessary. For example, when a station could be buried in the side of a hill (every part of it being concealed, save only the observing window, which could be disguised and made to resemble a natural crevice in the hillside), there is no excuse for locating the stations on top of the hill, clearly outlined against the sky, as is now the case. Where they cannot be concealed, they ought to be disguised.

An instance of the effective use of a disguise may be cited from the joint Army and Navy maneuvers held on the Atlantic Coast in 1902. A secondary station pertaining to one of the batteries in Portland harbor was located on a neighboring island. It was an improvised affair, consisting simply of a rough shack, erected by the men, of weather-beaten lumber, right on the beach. A crude sign, "Bathing Suits for Hire," was put up on the side of the building by way of disguise. Early in the maneuver week a landing party from the attacking fleet seized and occupied the island, but never discovered the existence of a fire-control station. For the entire remaining period of the maneuvers the "bath-house" on the beach continued to be an effective element of the defense.

It is reasonable to suppose that the fleet commander would make every effort to destroy as many fire-control stations as possible before entering upon the decisive phases of the attack.

OPERATIONS ON THE BELGIAN COAST.

A new type of vessel of very light draught, somewhat resembling a monitor, has been developed by the British during the present war. These vessels are more on the order of floating batteries than warships, and are said to be manned by detachments of coast artillery troops, under the command of coast artillery officers, instead of naval complements. These vessels, or floating batteries, have been performing very effective service in supporting the left flank of the Allied line on the western battle front, and in harassing the Germans occupying the coast of Belgium; yet, in spite of the powerful 15-inch gun with which each vessel is armed, these monitors have, so far as reports indicate, been unable to accomplish any decisive results in their attacks upon coast fortifications.

CONCLUSION.

In the consideration of naval attack upon coast fortifications, when all is said and done, two facts stand out clearly:

First. That battleships are built primarily to fight with other battleships and therefore are not the match of adequate coast defenses fully manned by trained troops.

Second. The only form of attack that promises success to the invader through the reduction and capture of coast defenses of a fortified harbor is a combined land and naval attack.

CHAPTER III.

DEFENSE AGAINST NAVAL ATTACK.

Let us assume that a state of war exists with a first-class over-sea naval power. What are the means at our disposal for resisting an attack by a fleet upon our fortifications?

CLASSIFICATION OF COAST DEFENSE.

The means of defense resolve themselves into several different classifications.

Primarily, there is the artillery defense, which in turn is divided, with reference to the kinds of fire, into guns and mortars, and with reference to weight and caliber, into the major, intermediate, and minor armament.

Secondly, there is the submarine defense, comprising mines, torpedoes, and the operations of submarine boats.

Thirdly, there is the aerial defense, as provided by aëroplanes and dirigibles.

Fourthly, there are the various auxiliaries, comprising searchlights, power-plants, fire-control stations, signal stations, picket- and patrol-boats, etc.

ARTILLERY DEFENSE.

Guns.

The function of guns is to attack the sides of incoming vessels; to this end guns are so constructed as to fire heavy forged steel projectiles at high muzzle veloci-

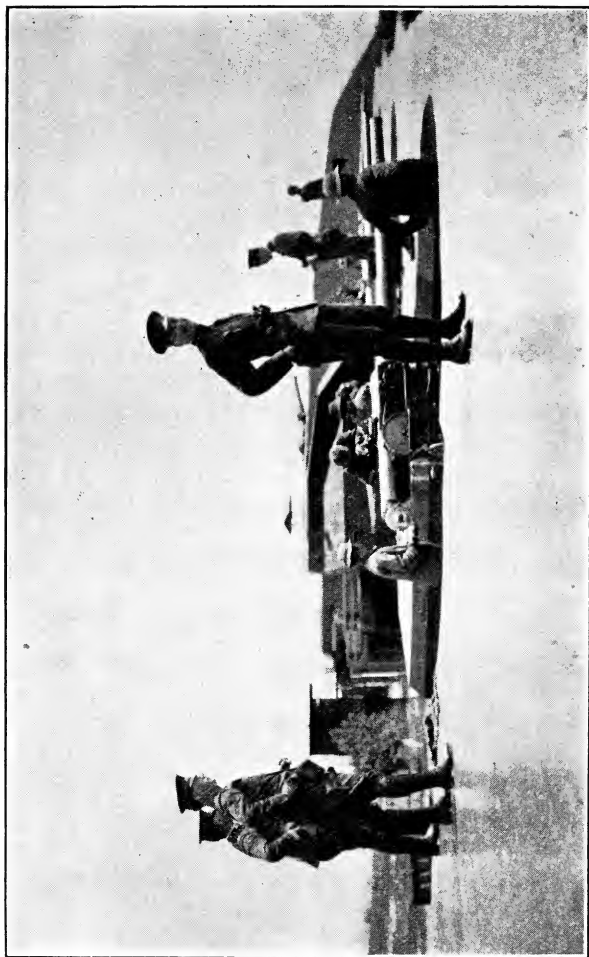
ties, capable of penetrating or shattering armor plate at a very considerable range. The kind of fire used with guns is known as "direct fire"—that is to say, where the angle of elevation does not exceed 15° .

Mortars.

Mortars, on the contrary, are fired at high elevations, varying between 45° and 65° . They throw the projectile to a great height (sometimes as high as five miles), and are calculated to strike the enemy's ships upon the decks. It is easy to imagine the effect that would be produced by a thousand-pound projectile, loaded with a high explosive, falling from an altitude of five miles and striking upon the deck of a battleship. There are few, if any, ships in the navies of the world that carry sufficient deck protection to prevent such projectiles piercing their decks and bursting in their vitals.

The effectiveness of mortars, assuming an accuracy of fire, is thus very apparent.

Mortars possess a further advantage over guns. *The effectiveness of a projectile is measured by its striking energy, which is dependent upon two factors—its mass, and the square of the velocity at the instant it strikes.* With gun-fire, the velocity starts to fall off the instant the projectile leaves the muzzle, and consequently the greater the range the smaller the striking velocity, and hence the less the effectiveness of the projectile. On the contrary, with mortars the striking velocity, due to the fall of the projectile from a great height, is substantially equal to the muzzle velocity, and consequently as the elevation increases the effectiveness of mortar-fire increases. As mortars use a system of fire whereby the weight of the powder charge increases with an increasing range, it will therefore



A BATTERY OF 3-INCH RAPID FIRE GUNS.

appear that the effect of a projectile striking a ship will be the maximum when fired at the maximum elevation of 65° with the largest powder charge, or at the innermost limit of the outermost zone. This would be at a range of some ten thousand yards.

Furthermore, the mortar, with an increasing striking velocity with increasing range, is attacking the relatively light armor of the protective deck; while the gun, with a striking velocity that decreases with increasing range, is attacking the relatively heavy armor of the turrets and sides of the ships.

As a matter of fact, while we cannot in any sense of the word dispense with guns, yet the most effective means of attacking a battleship are to be found in those weapons which attack from above and below the water, because a battleship is least able to resist such attacks; that is, the use of mortar-fire and submarine mines.

Classification as to Caliber.

The artillery defense is classified, in accordance with weight and caliber, into the major, intermediate, and minor armament.

The major armament consists of 16-, 14-, 12-, 10-, and 8-inch guns and 12-inch mortars; the intermediate armament of 6- and 5-inch guns, and the minor armament of 4.7-, 4-, and 3-inch guns.

The present-day tendency is towards a reduction in the number of different calibers. Thus, for example, as concerns the Navy, we have become familiar in the last few years with the "all-big-gun" battleship of the dreadnaught or super-dreadnaught type. Formerly it was no uncommon thing for a battleship to be armed with four 12-inch, eight 8-inch, twelve 7-inch, and twenty 3-inch

guns—as, for example, the *Kansas* class. Nowadays a battleship such as those of the *New York* class carries ten 14-inch and twenty-one 5-inch guns. In other words, the primary battery should be provided with the heaviest guns that the requirements of the particular fort or ship may demand. Thus, as a general rule, there is little or no use for 7-, 8-, and 10-inch guns.

The 14-inch gun was adopted as the standard large caliber gun for our coast defenses as the result of the investigations and recommendations of the Taft Board. An unfortunate difference of expert opinion in the service resulted in a considerable loss of effectiveness in the first guns of this caliber that were built. On the one hand, it was contended that as the energy of a projectile varied with the mass and the square of the velocity, an increase of mass would warrant a decrease in velocity without reducing the energy. The model of 1907 14-inch gun was therefore built only 34 calibers in length. Its muzzle velocity of 2,150 feet per second and weight of projectile of 1,660 pounds were calculated to give the same muzzle energy as the 12-inch 40-caliber gun, model of 1900, firing a 1,046-pound projectile, with a muzzle velocity of 2,250 feet per second. The only advantage thus gained lay in the fact of a longer life for the gun and consequent saving in cost—a consideration, when applied to items of national defense, that ought not to be a controlling factor. Further, whatever advantage, however questionable, was gained, was more than offset by a loss in accuracy, due to the more curved trajectory which resulted from the decrease in muzzle velocity and increase in mass of the projectile. Instead, therefore, of securing a more effective weapon for use against the ever-increasing range and power of naval guns and effectiveness of armor, there was

produced a 14-inch gun that was, in fact, not as effective as the 12-inch.

In the models of 1909 and 1910 there have been produced more effective 14-inch guns, 40 calibers in length, and giving the 1,660-pound projectile the adopted standard muzzle velocity of 2,250 feet per second.

One of the chief lessons learned thus far from the present war is the value of long-range weapons of great caliber, the effect of which upon our service has been the adoption of the 16-inch 45-caliber gun, with a range of 26,000 yards, as the minimum standard major caliber gun for our coast defenses.*

The plans of the Endicott Board called for an armored turret on Romer Shoals at the mouth of New York harbor, in which it was contemplated to mount two 16-inch guns. The construction of one of these was undertaken nearly twenty years ago, but a change in the plans, whereby the Romer Shoals turret was abandoned, resulted in the completed gun lying idle for many years at the Sandy Hook Proving-ground. The Taft Board contemplated mounting it at Fort Michie in the coast defenses of Long Island Sound, but it has finally been determined to install it, mounted on a disappearing carriage, as a part of the defenses of the Panama Canal. This old gun, however, is only 34 calibers in length, and is therefore not in the same class as the new 16-inch guns to be built in the future.

For intermediate guns against unarmored portions of vessels, but chiefly for the protection of the mine-fields, the 6-inch gun is eminently satisfactory.

In the Navy the use of 3-inch guns for the secondary battery has given way to guns of 5-inch caliber, as being much more effective against torpedo attack. The 3-inch

*Report of the Chief of Coast Artillery, U. S. Army, 1915, p. 9.

gun is still looked upon with favor, however, from a coast artillery point of view, for repelling landing parties and against torpedo-boats and other small craft.

It may therefore be safely predicted that in new fortifications the major armament will consist of at least 16-inch guns and 12-inch mortars, mounted, whenever necessary, for all-around fire; the intermediate armament, of 6-inch guns, and the minor armament, of 3-inch guns.

Tactical Organization.

For the tactical handling of guns in coast defenses, contiguous guns of the same caliber are grouped in batteries; contiguous batteries covering the same or adjacent fields of fire are grouped into fire commands, all the fire commands of a fort constituting a fort command; all the fort commands of a given harbor constitute a coast defense command.

Rapid-fire guns assigned to the protection of mine-fields, together with all other elements of the mine defense of a fort, constitute a mine command. The mobile troops forming a part of the garrison of a coast artillery fort, whose function is the protection of the landward side of the fort, form the support command. Both of these commands are coördinate with a fire command and are subordinate to a fort command.

SUBMARINE DEFENSE.

For submarine defense two forms of weapons are provided—viz., torpedoes and mines. The torpedo, which has been highly developed in our Navy, is virtually a small submarine boat carrying a high explosive, and which is discharged from a tube by compressed air in the direction of the enemy's ship.

The submarine mine is peculiarly adapted for coast defense, and has received a high development in the Coast Artillery Corps. Some of the mines are spherical in shape, and others are cylindrical, with spherical ends. These are loaded with a high explosive known as "trotol," and the mine is controlled electrically from shore. In the absence of electrical current, or in the event of a mine breaking loose, no possible harm can come to friendly shipping from contact with the mines.

It will be remembered that during the late Russo-Japanese War a number of friendly and neutral vessels were destroyed through coming in contact with mines which had broken loose from their moorings. Especially was this true in the vicinity of Port Arthur.

In the early part of the present war floating contact mines were set adrift in the North Sea by the Germans, and some vessels were destroyed by them.

American mines are eminently effective when needed and absolutely harmless when not needed; in fact, it has been said that the device for closing the circuit, thus causing the current to ignite the primer (which is a secret piece of mechanism), is so perfect in its mechanical and electrical details that it cannot fail to act.

The mines are planted in groups, the number in a group being determined by the number of conductors in the submarine cable connected with the shore. Each mine has a separate panel on a switchboard in a building known as the "mining casemate." On this panel are the necessary switches and electrical devices for the proper manipulation of the mine.

During periods of watching, the switches in the mining casemate are thrown in such a manner that a signal would be given if one of the mines should be dis-

turbed by a passing vessel. Should this be one of the enemy, it is but the matter of a second or two to fire the mine and destroy the vessel.

In case of fog or thick weather, when it is impossible to observe the mine-field, or to distinguish whether vessels are friendly or hostile, the mines may be connected in such a manner that the contact of a vessel with a mine, instead of signaling to the mining casemate, would result in the instant explosion of the mine.

A third method of mine-firing is what is known as "judgment firing." This is the kind habitually used in mine target practice, the results of which have been eminently satisfactory, a majority of the mine companies having made 100 per cent of hits.

In this method the target, or hostile vessel, is "tracked" on the plotting-board. From the line of direction that is being followed, it is easy to see which mine is being approached. From the known speed of the target or vessel, the length of time it will require to reach that mine is easily determined. Therefore, at the expiration of that time the firing-switch in the mining casemate can be closed, and the mine fired with the expectation that the target or vessel is within the radius of destruction.

The value and effectiveness of submarine boats in conducting a raid against an observing or blockading fleet has been amply demonstrated in the present war. This function of the submarine came first into prominence with the destruction of the British armored cruisers *Aboukir*, *Cressy*, and *Hogue*, in the North Sea. Numerous other incidents have occurred as the war has developed, including the loss of warships and transports of the Allies engaged in the Dardanelles campaign, and the more recent

destruction of German warships in the Baltic at the hands of British submarines.

The attack of German submarines upon unarmed merchantmen, including passenger ships, on the high seas, can hardly be considered as establishing a precedent for civilized warfare; yet the success of these attacks has demonstrated the value of the submarine in preventing the running of a legally established blockade, as well as for offensive use against a blockading or attacking fleet.

Submarines, although engaged in coast defense operations, are actually handled by the Navy, and form no part of the work of the coast artillery troops.

It may be of interest to state that, in some foreign countries, notably in France and Germany, the entire system of coast defense pertains to the Navy Department. Such an arrangement undoubtedly results in a better coördination of all elements of the seaward defense.

AERIAL DEFENSE.

Aërial defense has been mentioned before as a part of the general scheme of coast defense. While aërial navigation is of very recent development, yet the experiences of the present European war have already demonstrated the great value of aëroplanes for strategic reconnaissance. It is believed that they could render very effective work of this character in connection with coast defense operations, and also might be of value in the matter of dropping explosives upon the decks of the attacking vessels.

A further use will be found in repelling an aërial attack, dirigibles of the Zeppelin type being especially vulnerable to attack from above by aëroplanes.

Should the attacking fleet take advantage of a low fog or of a smoke-screen, aëroplanes can be effectively used

by flying over certain of the vessels of the fleet and conforming to their course. The observers "tracking" an aëroplane will enable the plotter to obtain a fairly accurate course of the ship it represents. While the degree of accuracy in range- and position-finding by this means is not as great as when observations are taken directly upon the vessels, yet it is immeasurably better than nothing.

Still another practical use of aëroplanes is to be found in connection with the observation of the fire of the shore batteries, and the application of such corrections to the range as will make that fire more effective.

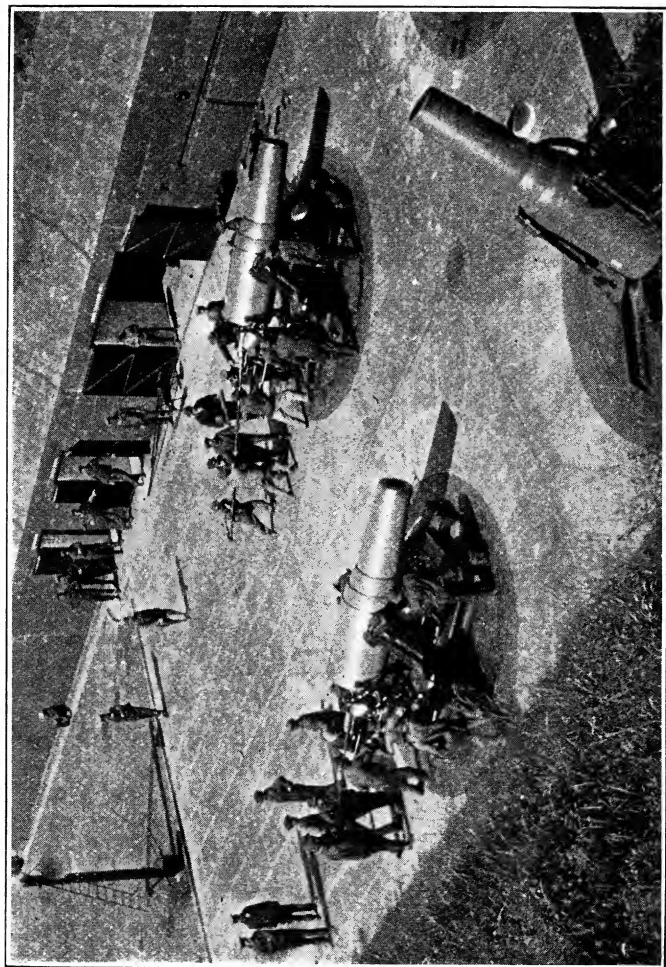
AUXILIARY ELEMENTS.

What might be termed the "auxiliaries of coast defense" include the fire-control stations with their equipment, searchlights, power-plants, signal stations, and picket- and patrol-boats.

By means of the fire-control installation, communication is maintained between all points of the coast defenses, so that the will of the commander can readily be made known to the least important subordinate. This installation also provides the means for locating targets and finding and correcting the ranges.

The use of the searchlight is limited to night work in discovering and illuminating the vessels of the enemy.

Each fort is provided with a central power-plant to furnish power and light for the various elements of the defenses. In addition, small emergency plants, usually equipped with internal combustion engines, are provided for each battery or group of batteries and for each searchlight. Signal stations are equipped for communication by



A MORTAR PIT.

radio, flag, heliograph, lantern, Ardois, or other authorized means of signaling.

Picket- and patrol-boats are for the purpose of preventing raids on mine-fields, and the landing of small parties to attack outlying searchlights and fire-control stations. They are especially valuable in thick weather, giving timely warning of the approach of the enemy.

GENERAL DEFENSE PLANS.

In order to properly handle the coast defenses so the most efficient use of the various elements may be had, general defense plans are made in time of peace and thoroughly practiced under all conditions of weather, both day and night, so that the personnel is thoroughly familiar with the details.

As an instance of the necessity for this, take the tactical handling of the searchlights. Without such a plan, it is easy to conceive of the lights being thrown about in such a manner, each independent of the others, as to interfere one with another and cause utter confusion.

By the use of such a plan, certain outlying searchlights are designated as "barrier lights." They are thrown across the entrance to the harbor, intersecting beyond extreme range. No vessel, therefore, could enter the harbor without passing through the beam of one or the other of these lights, and would be quickly detected by the watchers on shore. Instantly one or more lights adjoining these outlying ones would be placed in action and directed upon the target. These would follow it in, while the batteries opened fire on it.

The barrier lights would still remain covering the harbor entrance for the purpose of illuminating any other approaching vessel of the attacking fleet. When the first

vessel has passed far enough along in the harbor, other searchlights will illuminate it, and other guns not theretofore in action will be brought to bear on it.

In the meantime the first lights will illuminate other approaching vessels, and the batteries first in action will open fire on them. *By such a means as this, which is the general principle underlying the formulation of defensive plans, a target is passed from fire command to fire command with a minimum of interference and a maximum of efficiency.*

FUNCTION OF OUR NAVY.

A question that naturally suggests itself in discussing the means of defense of our fortified harbors is, What is the function of our own fleet? It is a well-recognized principle of naval strategy that *the function of the fleet is primarily offensive. Its mission is to gain and retain the control of the sea.* To this end it must cut loose from its own base and seek out and destroy the enemy's fleet upon the high seas. If our fleet were to be tied to the coast-line, its strength would be frittered away in small dribblets, and it would be impossible to gain or retain the all-important control of the sea. As a matter of fact, so long as we hold this control, an invasion of our territory from across the sea is practically impossible.

Therefore, the very best aid to coast defense that our fleet can render is by offensive action well beyond the limit of our coast.

There is one way, however, in which the Navy can and will be of inestimable assistance in the actual work of coast defense, and that is by means of submarines. While these vessels serve under the immediate orders of the commandants of the naval districts into which our

coast-line is divided, they would unquestionably coöperate with the coast defense commander in the general plan of defense.

The Navy, and in all probability the naval militia, could also render most effective aid in reconnaissance work in providing the necessary vessels for patrol and picket duty. These also would operate under the orders of the naval commander, but would coöperate with the coast defense commander.

CHAPTER IV.

COMBINED LAND AND NAVAL ATTACK.

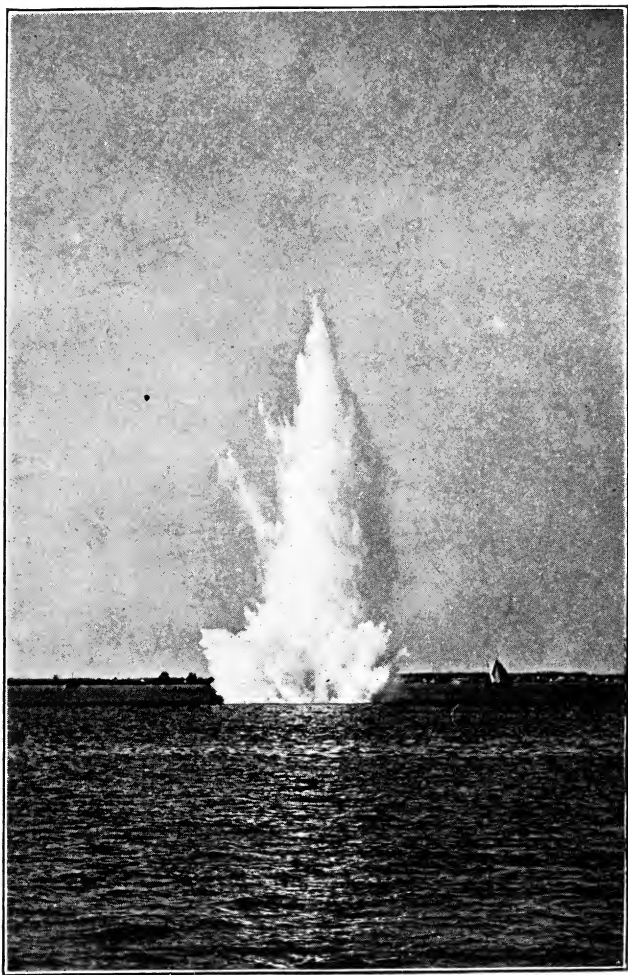
MOST PROMISING FORM OF ATTACK.

We already have seen in our discussion of the problems connected with attack and defense of our fortified harbors that a purely naval attack will not promise any great degree of success. The question naturally confronts us, as it would a naval commander, What is the form of attack which would seem to be most productive of success?

The answer to this question is simple,—the actual carrying out of the proposed plan may indeed be very complex. The form of attack which would undoubtedly be undertaken, if a serious attempt were made to reduce the defenses of Puget Sound, would be a combined land and naval assault.

PRELIMINARY BOMBARDMENT.

This would involve a bombardment of the forts at long range, following upon a reconnaissance in force. The latter is for the purpose of developing the strength of the forts on their sea front, and discovering the position of all batteries. Thus, when the bombardment which is to accompany the land attack is undertaken, every battery may be made a target for the fleet. All artillerymen would consequently be kept at their posts, and would not be available for reinforcements on the land front.



AN EXPLOSION OF A SUBMARINE MINE.



LANDING OF TROOPS.

The troops accompanying the attacking fleet would be landed at some suitable point, and a march undertaken against the land fronts of the forts.

It will be recalled that this was precisely the form of attack used at Santiago during the Spanish-American War. The Fifth Army Corps, under the command of Major-General Shafter, was put ashore from transports at Siboney and Daiquiri, on the south coast of Cuba and a few miles to the eastward of the entrance to the harbor of Santiago.

The disembarkation was made under the cover of guns of the fleet. Having landed, the army pushed forward, with a view to taking possession of the city and investing Morro Castle on the land side. The first opposition was encountered at Las Guasimas, where a skirmish was fought. Then came the three-days fight at El Caney and San Juan Hill, where the entire Spanish line was captured and the city placed at the mercy of American arms.

On the afternoon of the last day of the fight, when it was realized that American victory was assured, and that the harbor would no longer be a safe place for Cervera's fleet, he put to sea for the purpose of running the gauntlet of the American fleet. The result was the loss of every one of his ships.

During the attack by General Shafter's army, a constant bombardment of the fortifications was maintained by the blockading fleet. This is a splendid example of successful operations against a fortified harbor, when carried out in the form of a combined land and naval assault.

It is true that Morro Castle itself was not attacked, the capitulation of that fort being forced through the fall of the city and the destruction of the fleet.

A more recent instance of an attack of this kind is to be found in the Dardanelles campaign, now being conducted by forces of the Quadruple Entente against the Turkish fortifications. The objective of the attack is the city of Constantinople, the capital of the Turkish Empire, situated on the Bosphorus, between the Sea of Marmora and the Black Sea.

Two avenues of approach were open to the choice of the attacking force. A landing might have been effected on the Turkish coast to the north of the entrance to the Dardanelles, and an overland campaign by way of the Chatalja lines undertaken. The alternative plan involved the passage of the Dardanelles, necessarily demanding the reduction or capture of the successive lines of coast fortifications, defending the strait on both the European and Asiatic sides.

The former plan is open to two objections—viz., the lack of a suitable base of operations on the Turkish coast to the westward of the Dardanelles, and the strength of the Chatalja lines. It will be remembered that the latter successfully sheltered a defeated Turkish army for a period of six months against the victorious Bulgarians during the first Balkan War; yet, on the other hand, the present war has clearly demonstrated the ineffectiveness of permanent land fortifications against modern heavy artillery—as, for example, the successful German attacks upon Liège and Antwerp. There is more than a possibility that an attack upon Constantinople by an overland campaign, even though it might have involved the reduction of the fortifications of Adrianople, as well as the assault upon the Chatalja lines, might have been more successful than the thus far abortive attempts to force the Dardanelles.

The experiences in the Dardanelles campaign have corroborated in detail the general principles already enunciated as pertaining to the attack and defense of coast fortifications. Attempts to force a passage of the straits, amounting virtually to a "run past," have been defeated with heavy losses, while bombardment of the defending forts has accomplished nothing, as far as decisive results are concerned. Even the combined land and naval attack which has been prosecuted so vigorously for the greater part of a year has not yet accomplished its purpose. All these facts illustrate the supreme difficulties that lie in the way of the capture or destruction of adequate and well-defended coast fortifications.

SUITABLE LANDING-PLACE.

In making a combined land and naval attack upon the defenses of Puget Sound, it is reasonable to assume that the commander of the invading forces would pursue some such plan as the following:

The first essential requirement would be a suitable landing-place. The best possible point for landing would be Port Discovery Bay, which is immediately to the westward of the Quimper Peninsula, on which Fort Worden is situated.

Experimental mortar-firing, conducted a few years ago at Fort Worden over the seven miles of intervening land into the mouth of Port Discovery Bay, has shown conclusively that the effectiveness of such fire renders that bay untenable as a landing-point. As a matter of fact, the sixteen mortars at Fort Worden effectively cover the entrance to the bay; twenty-four mortars, including the eight at Fort Flagler, cover a very considerable area; and beyond the limit of the Worden mortars to the south-

ward, the eight at Flagler cover the entire area to the head of the bay. Port Discovery Bay may therefore be entirely eliminated as a possible landing-point for the enemy.

This means a longer and more difficult approach from some point farther to the westward. It is possible that Washington Harbor would be chosen. Here would be found ample space on the Sequim prairie for the encampment of the troops and establishing of a base. The approach would then be made by marching in a southeasterly direction and around the head of Port Discovery Bay; and then approaching Fort Worden from the south. Of course, the advance of the enemy would be resisted, and every effort made to prevent his carrying out his plans to a successful issue.

MARCH IN ENEMY'S COUNTRY.

Having effected his landing and established his base, the march would then be taken up under conditions governing the operation of an army in the enemy's country. An efficient service of information would be established, and patrols would be sent out for the double purpose of gaining information concerning the defenders and to familiarize themselves with the topography of the country.

On the march, a strong advance guard would be necessary at all times, and for a considerable portion of the way flank guards would be maintained on parallel roads. Much of the country over which the invaders would be obliged to operate is heavily wooded; so dense is the undergrowth as to make it practically impossible for bodies of troops to advance, except on the few roads and trails that exist.

This condition of affairs is a positive detriment to

the invader, while to the defenders it possesses both advantages and disadvantages, the latter being chiefly in the matter of keeping up communication between different points of the line and the assembling of reinforcements.

MEETING WITH COAST GUARD.

When the coast guard is met in force, it becomes the duty of the commander of the invading forces not only to dislodge the defenders from their position, but, if practicable, to put them to rout. If they are merely dislodged, they will take up another defensive position, and so prolong to a considerable extent, by moving from one position to another, the time necessary for the accomplishment of the mission of the invaders, and would also wear out the attacking force. The necessity, therefore, of complete annihilation of the defenders, as was the case at Santiago, is of the utmost importance.

Time is a most essential factor in operations of this kind, for every hour's delay means a strengthening of the means of defense and a corresponding increase in the difficulties in the way of a successful attack. This explains the use made at Santiago of frontal attacks upon the intrenched positions of the Spaniards, instead of the more deliberate, but less costly, enveloping attack. This also emphasizes the necessity for the attacking force to greatly outnumber the defenders.

In the attack upon the Spanish blockhouse at El Caney, there were 6,653 American troops engaged against only 520 Spaniards, and in taking the position we suffered a loss of 441.* At San Juan Hill the American strength was 8,412 and the Spanish only 1,197, while our losses aggregated 1,093 in killed and wounded.† While our

*"Campaign of Santiago," Sargent, Vol. II., p. 107,

†*Ibid.*, Vol. II., p. 130.

losses were nearly as great as the entire force of the enemy, they were justified by the accomplishment of the mission in the capture of the city, the forcing out of the harbor of Cervera's fleet, and the surrender of the fortifications. A delay which would have permitted the strengthening of the Spanish position and the arrival of reinforcements might have proved fatal to the American attack.

Having located the enemy in his intrenched position, it would be the duty of the commander of the invading force to cause the most careful and accurate reconnaissance to be made. He would then make his attack, based upon the information as to strength and disposition thus obtained.

ENVELOPING ATTACK.

It is safe to say that the form of attack that would promise the best results would be an enveloping attack; that is to say, an attack on the defenders' front and at least one of his flanks simultaneously. - Assuming this attack to have been successful, it would be of the utmost importance for the attackers to turn defeat into rout.

The advance upon Forts Worden and Flagler would be resumed immediately. Should the defenders take up other defensive positions, a similar course of action would be pursued.

ATTACK ON LAND FRONT OF FORTS.

Let us assume that the invaders have reached the immediate vicinity of Port Townsend. The coast guard has been utterly defeated, and the units that have not surrendered have been put to rout. There is nothing now to prevent the final accomplishment of the object of the

campaign but the actual defenses of the land front of the fort itself.

These defenders are known as "coast artillery supports." They will have established themselves in trenches and redoubts. While the bulk of this force is composed of infantry, there will be siege, field, and machine guns behind ample protection and, as a general rule, concealed. While the troops defending the land fronts of the forts are relatively few in number, they will be so placed as to command the approaches and render a successful assault extremely difficult and costly.

SIEGE OPERATIONS.

Two methods are open to the invader. The first is the possibility of dislodgement by assault following a heavy artillery fire, and the second is the operation known as "sapping and mining." The former is costly, while the latter is slow and tedious, involving the forming of a cordon entirely around the land front of the fort and the advancing of the intrenched lines by regular stages.

The work of constructing intrenchments is done, as far as possible, under cover of darkness. The trenches that front toward the fort are known as "parallels." A succession of parallels are connected by zigzag trenches, known as "approaches," so that troops passing from one to another cannot be subjected to the fire of the enemy, except for brief spaces of time.

Finally, when the line has come close enough to the defenders' position to warrant mining operations, trenches and galleries are run out directly to the front, the workmen being protected by saps and other forms of head cover.

The galleries themselves are underground passages, running directly towards the enemy and terminating in

mine chambers. These are subsequently filled with explosives. If the defenders gain information as to the means employed by the attackers, it is more than likely that they will institute counter-mining operations, with a view to meeting and destroying the work of the attackers.

Assuming, however, that the invading force was successful in its operations, with the mines all placed, the attack would be made by exploding all the mines simultaneously. In the now obsolete stone fort the object was to make a practicable breach in the walls. Nowadays, with earthworks, the idea rather would be to create as much destruction in the redoubts and trenches as possible, as well as demoralization among the personnel of the defenders.

The discharge of mines would be preceded by a heavy artillery and infantry fire from the innermost parallels, and immediately upon the explosion of the mines an assault would be made all along the line.

Admitting that the attack was successful, the fate of Fort Worden would be settled, for it must be remembered that artillerymen are trained to depend on their guns as their weapons of defense and to stick to those guns to the last moment. Thus they are not able to personally defend themselves against an assault of this kind from the rear. They rely on the coast artillery supports for such protection. These, together with the coast guard, we have conceded to have been defeated, for the sake of argument.

DESTRUCTION OF FORT BEFORE SURRENDER.

It is reasonable to suppose, however, that before surrendering the fort every possible effort would be made to destroy or render unserviceable the guns and all their

accessories. *It would naturally be desirable, from the point of view of the attacking commander, to seize these guns intact, because Worden is but one of the forts established in that vicinity for the protection of Puget Sound. With its guns and mortars in the hands of the enemy, they could be utilized to considerable advantage in bombarding the other forts.*

Thus it will be seen how important it is to destroy the guns when they are no longer capable of being used in American defense. This would be accomplished simply by discharging a gun with the breechblock only partly closed, which would result in irreparable wrecking of the breech mechanism. In the case of mortars, two would be loaded and trained upon each other, muzzles together. The concussion would completely wreck both mortars and probably everything else for a considerable distance about.

One does not like to contemplate the surrender of an American fort or American troops, and it is not believed for a moment that an attack such as described would be successful; but it must be borne in mind that in this chapter we are considering the question from the point of view of the invading force.

The natural advantages lie primarily with the defenders, as will be shown in the next chapter.

CHAPTER V.

DEFENSE AGAINST A COMBINED LAND AND NAVAL ATTACK.

CLASSIFICATION OF DEFENDING TROOPS.

The troops actually engaged in the repelling of an invader are divided into three classes. Coast artillerymen man the guns, mortars, submarine mines, and the various accessories of the fixed defenses. The coast artillery supports are the troops, usually few in number, which guard the land defenses of the fortifications themselves. Then there is a large body of troops (the size depending upon local conditions), known as the "coast guard," maintained for the purpose of preventing the landing of the invader, if practicable, or in any event preventing his approach to attack the land fronts of the forts.

Coast Artillery Troops.

The coast artillery troops would comprise a sufficient strength to man all the elements of the fixed defense. Their number would depend on the requirements of the particular fort under attack, and would comprise both regular coast artillery troops and coast artillery militia.

Coast Artillery Supports.

The coast artillery supports would, in general, be composed of infantry, with perhaps a few coast artillerymen to handle siege and field guns, emplaced semipermanently. The number of these troops would be relatively small—for instance, not exceeding one regiment

for the entire coast defenses of Puget Sound. A battalion probably would be assigned to the land side of each of Forts Worden, Flagler, and Casey.

Coast Guard.

The strength of the coast guard also would depend upon local conditions. It might be said, as a general rule, that if the particular point is worth defending, and therefore liable to concerted attack, the smallest force that could, with any degree of safety, be considered for coast guard duty would be a brigade of infantry, together with some field artillery and cavalry. In all probability the force for the more important points would be a division.

DETERMINATION OF INVADER.

We have already seen that a combined land and naval attack is the only kind of an attack that promises any degree of success, and therefore, if undertaken, will be pressed with vigor.

The intention of the enemy probably will be determined very soon after he begins his operations. Thus it should be known by the coast defense commander that the bombardment is simply for the purpose of engaging the batteries and the personnel while attack is made by the landing forces.

He therefore will not waste an undue amount of ammunition in a more or less ineffective long-range fire. The mortars being especially effective at the longer ranges, an effort would be made to disable the ships of the enemy by their fire. The gun batteries will fire only at rather long intervals, probably several minutes elapsing between shots; the idea being to keep the fleet from attempting some other means of attack that might result

from the exhaustion of ammunition or a fancied suppression of the fire of the shore batteries.

In other words, it would be the duty of the coast defense commander to keep the commander of the attacking fleet thoroughly informed that he is alive and amply able to defend himself all the time, without wasting his ammunition.

KNOWLEDGE OF THE COUNTRY.

In time of peace the country surrounding the various coast defenses for a very considerable distance is thoroughly and accurately mapped, so that all its topographical features are a matter of record.

Officers stationed at the various coast defenses are encouraged to familiarize themselves thoroughly with the country by riding, walking, or motoring over it, so that they know individually and by practical observation everything concerning its character.

In addition, a portion of the instruction each year is devoted to problems of attack and defense in that part of the country which naturally would be the theater of operations for the coast guard and invaders in time of war. In this way practical problems are worked out, having the effect of familiarizing both officers and men with what might reasonably and logically be expected to be the conditions in time of war.

Assuming that war has been declared, and the troops constituting the coast guard have been mobilized, with headquarters say at Port Townsend, the first duty of the general in command would be, by means of reconnaissances, to familiarize himself personally with the country he is required to defend. He would then dispose his troops, following plans which have been formulated in

time of peace, in such a manner as to provide both a ready and accurate service of information and the means of arresting the progress of an invading force.

NECESSITY OF PREVENTING A LANDING.

In the event of a combined land and naval attack, the first duty of the coast guard would be to prevent a landing. In the Santiago campaign the Spaniards made their first serious blunder in not having contested the landing, as did the Turks on the Gallipoli Peninsula. The information as to the movements of the fleet being communicated to him, it would be the endeavor of the coast guard commander to concentrate all his forces at the threatened point of attack.

As has been already noted, the very best possible line of defense is a shore-line. No protection is afforded troops in small boats, whereas all possible protection can be afforded to troops stationed on or near the shore-line. It is therefore of the greatest possible importance that the defending commander prevent an actual landing. Realizing this, the commander of the invading troops will endeavor to outwit the coast guard by making a feint at one point and landing the bulk of his force at another.

DEFENSIVE ACTION, WITH COUNTER-ATTACKS.

At any rate, we will assume that such a landing has been effected. The commander of the coast guard, having received information to this effect, will dispose his forces in a good defensive position (of which there are many on the Olympic Peninsula), but will not confine himself to a passive defense.

It may be stated as one of the fundamental principles of strategy, that *decisive results never are accomplished on the*

defensive. Thus, while the conditions governing the operations of the coast guard make it absolutely essential that strong defensive positions should be selected and occupied, yet an active and energetic commander, who thoroughly appreciates the functions of his office, never would be content to remain passive behind breastworks.

A glaring instance of the failure to take advantage of one's opportunities is to be found in the action of General Toral at Santiago. At the time General Shafter's army landed on the southern coast of Cuba there were in the Province of Santiago 36,582* Spanish soldiers and about 1,000 marines, who were disembarked from Cervera's fleet; and yet apparently no effort was made to prevent the landing of the American forces. When Shafter undertook the attack with his small army corps of only 17,349† officers and men, there were actually opposed to him in the trenches of San Juan and the blockhouse at El Caney only 1,717‡ Spanish troops. Thus less than one-twentieth of the available Spanish force was utilized in its proper function as a coast guard. Very naturally, the invader gained the result of his mission.

It may therefore be laid down as a principle that, *while acting generally on the defensive, the commander of the coast guard must be ready to take advantage of every opportunity for an effective counter-attack that may defeat the purposes of the invader and drive him back into the sea.*

FINAL DEFENSIVE POSITION.

Let us assume that the invader has succeeded in getting around the head of Port Discovery Bay, and has

*"Campaign of Santiago," Sargent, Vol. I., p. 102.

†*Ibid.*, Vol. III., p. 217.

‡*Ibid.*, Vol. II., p. 130, foot-note.

begun a march north on the Quimper Peninsula. The coast guard would have fallen back and taken up its final defensive position at a point probably in the vicinity of Chimacum. Here the ground is thickly covered with the densest of undergrowth, making a veritable jungle. The roads and trails are few, but well defined, and natural defensive positions exist in large numbers. The possibility of the enemy being able to force these positions is decidedly remote.

One of the essential requirements of a good defensive position is that its flanks rest on impassable objects. Here these objects are Port Discovery Bay on the west and Port Townsend Bay on the east. *Another requirement is a clear field of fire to the front.* Such a field would be provided during the period of waiting by cutting down the trees and undergrowth to a sufficient distance in front of the selected position, so that the enemy would be required to approach over open ground that could be easily fire-swept.

The woods being impassable to large bodies of troops, or even patrols, the enemy would be forced to advance in columns along the roads, where relatively small bodies of the defenders could hold him in check and throw him into confusion. Thus it may be said that of the problems involved in the attack and defense of Forts Worden and Flagler from the land side, all are naturally favorable to the defender, and an attacking force would be obliged to fight for every foot of ground gained.

LAND DEFENSE OF FORTS.

The theory of the land defense of our coast forts has been considerably modified as the result of the use of enormous guns in the field in the present European war.

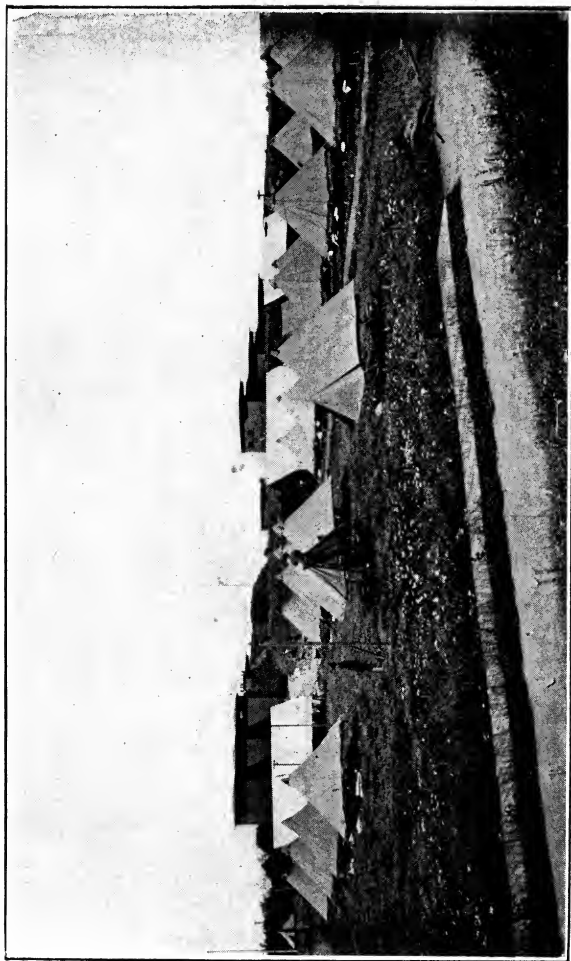
Instead of limiting the artillery of the landward side of the forts to such field and siege guns and howitzers, none exceeding 7-inch caliber, as are issued to the various forts for that purpose, it is now contemplated utilizing the guns emplaced for the seaward defense.

A careful study of the entire question has been made, together with experimental firing by the mortars of Fort Mills, Corregidor Island, against the summit of the highest of the Mariveles Hills on the adjacent mainland. As a result, the feasibility of utilizing the armament in this manner has been very clearly demonstrated, and the effectiveness of the forts increased thereby to a very great extent.

In some instances it will be necessary to alter present gun carriages and emplacements in order to provide for an all-around fire, but in many other instances—as, for example, in the coast defenses of Puget Sound—the guns of one fort at the present time admirably cover the land approach to one or more of the other forts of the harbor.

This new use of the fixed armament requires the adoption of shrapnel as one of the regular types of projectile to be issued to the coast artillery, and also involves the solution of the somewhat complex problem of fire-direction and control. In all probability the method to be adopted will be an adaptation of the “square system,” in connection with lookout stations located at favorable points in the area covered and with aëroplanes.

While considering the subject of the land defense of the forts, a few words as to the functions of the coast artillery supports will be of interest. Let us take Fort Flagler as an instance of this, and assume that the defenders would comprise one battalion of infantry and a few men taken either from the infantry or coast artillery



A GROUP OF FIRE-CONTROL STATIONS.



to man several siege and field guns. These troops would be disposed in such a manner as to gain timely information of the approach of the enemy and, in the event of such approach, to repel landing attacks.

The entire force would be virtually disposed as an outpost. Trenches have been constructed in time of peace, covering all approaches to the reservation, and would readily be occupied by bodies of troops of sufficient strength to repel any attack. Of course, until such time as the coast guard were defeated, no attack of greater moment than a raiding force could be expected on the land fronts of any of the forts, and it is against surprises of this nature that the coast artillery supports are provided. The work is essentially one of security and information.

The pickets and out-guards must be constantly on the alert and ready to give warning of the approach of the enemy, while patrols undoubtedly would be sent out on both Marrowstone and Indian Islands for the same purpose.

Word of the enemy's approach having been received, the troops held in reserve would be rushed immediately to occupy the trenches at the threatened point of attack. In the improbable event of the defeat and rout of the coast guard, the supports would constitute the last element of defense on the land fronts of the forts, and would be held constantly in the trenches. Should siege operations be undertaken by the invader, the defense would resort to counter-mining operations, as explained in Chapter IV.

It was stated in Chapter I. that our coast defenses are ample on the sea front, but weak on the land side, which in general is true; yet with the increasing range and caliber of naval guns, modifications in our present carriages to provide for firing at higher elevations and larger guns

are essential for effective long-range work. With reference to the general weakness of the land fronts, the coast defenses of Puget Sound are to some extent an exception, due to the characteristics of the country surrounding the forts, providing very considerable natural advantages to the defense, and, as already stated, an invader would have the greatest difficulty in making an advance.

TROOPS TO FORM SUPPORTS AND COAST GUARD.

One vital point remains to be considered, and that is, Where are we going to obtain an adequate force, even as small as a brigade, for assignment to duty as coast guard for the Olympic Peninsula immediately on the outbreak of war?

The military policy of the nation is almost a negative quantity. Our Army is vastly below the requirements even of peace service. On the outbreak of war large concentration camps would be established. Brigades and divisions of the regular Army and Organized Militia would be mobilized and the larger units organized, while the organization and training of the second line (*i. e.*, the volunteers) would be undertaken immediately. But while this work would be going on, the coast guard would be required in the vicinity of every fortified harbor. It is a serious question as to whether sufficient troops would be immediately available both for the general mobilization referred to and the most important functions that devolve upon the coast guard.

It might be said that the War Department now has under consideration the establishment of a brigade post on Puget Sound. This is a logical and very necessary consideration. If such a post were established, the troops for the coast guard would be here and during time of peace

would be able to familiarize themselves thoroughly with the theater in which they would operate in time of war, and at the same time would be available for duty elsewhere after the danger of invasion of the Puget Sound country had passed. In the report of the Army War College on the subject of an adequate military policy, recently made public, Puget Sound is classed as one of the "critical" localities, and the recommendation made that a division be permanently stationed there.

NATIONAL GUARD INFANTRY.

A very reasonable source of the supply of the troops required for coast guard and coast artillery support duty would be the mobile forces of the National Guard of adjacent States. There is a feeling of especial satisfaction on the part of the citizen-soldier when he knows that his function in time of war will not only be national defense, but the actual defense of his own State and city against invasion. In the case of the defenses of Puget Sound, the coast artillery militia of the State of Washington will be assigned to batteries which will defend the approach to their own homes, and it is eminently fitting that troops of the mobile forces of the same State should be similarly assigned to the land defenses of the forts.

But here again a deficiency is at once apparent. At least a regiment of infantry is required for coast artillery support duty, and at least a brigade, with some cavalry, field artillery, and signal troops, if not a division, for coast guard duty. To supply this need, the State of Washington is able to provide but one regiment of infantry, a single troop of cavalry, and a single field company of signal troops.

The pressing demand for an adequate force of trained

troops on the outbreak of war for this most important duty would seem to indicate the great desirability for the State of Washington to maintain as its minimum force a brigade of infantry, a squadron of cavalry, a battalion of field artillery, a field company of signal troops, and fourteen companies of coast artillery.

APPENDIX A.

ATTACK AND DEFENSE OF FORTIFIED HARBORS.

Correspondence Course.

LESSON I.

(Chapter I.)

GENERAL PRINCIPLES OF COAST DEFENSE.

1. (a) Into what two classes are permanent fortifications divided?
(b) Which of these classes is made use of to a considerable extent in Europe?
(c) Which in this country?
2. (a) Define "coast defense."
(b) What points of a coast-line are selected to be defended?
3. (a) Name five principal defended harbors on the Atlantic Coast.
(b) Two on the Gulf Coast.
(c) All on the Pacific Coast.
(d) All beyond the continental limits of the United States.
4. What is the ideal location of a coast defense fortification, and why?
5. (a) Name the two general classes of attack against coast fortifications.
(b) Subdivide naval attacks.

6. Give some pertinent reasons why a "run past" would probably not be undertaken.
7. What is the only form of attack that will promise any degree of success?
8. (a) Make a rough sketch showing the location of the forts constituting the coast defenses of Puget Sound.
(b) State why Fort Flagler possesses certain advantages in the matter of land defense over the other forts.
9. Suppose Forts Worden and Casey should be reduced or captured, what would be the problem that still confronted the invader?
10. Discuss fully the military importance of the coast defenses of Puget Sound in time of war with a naval power operating in the Pacific Ocean.

LESSON II.

(Chapter II.)

NAVAL ATTACK.

11. Name the different forms of attack or operations which might be undertaken by the invader.
12. In the unlikely event of a "run past," tell how this might be accomplished, stating advantages and difficulties to be encountered.
13. (a) What is a blockade?
(b) What disposition of his forces would the invading admiral make to render a blockade effective?

14. (a) What is a bombardment?
(b) Why is a bombardment usually ineffective?
(c) Quote an historical example.
15. What is meant by a "reconnaissance in force"?
16. What would be the probable form of attack?
17. What part of the defenses would be most likely to suffer from a bombardment?
18. For what purposes are battleships primarily built?
19. What is the only form of attack that promises any degree of success?
20. Discuss the risk involved to armored ships in subjecting them to the fire of coast fortifications.

LESSON III.

(Chapter III.)

DEFENSE AGAINST NAVAL ATTACK.

21. What are the general classifications of the elements of coast defense?
22. How would you further classify artillery defenses?
(a) With reference to the type of weapon.
(b) With reference to caliber and use.
23. (a) What is the tactical use of guns?
(b) What is the tactical use and what are the advantages of mortars?
24. Name the calibers that pertain to each of the major, intermediate, and minor armaments.
25. What is the present-day tendency as regards the number of different calibers?
26. What are the functions of guns of the intermediate and minor armament?

27. (a) How would you subdivide the means for submarine defense?
- (b) What are the functions of submarine boats, and under whose command do they operate?
- (c) Discuss aerial defense.
28. Name some of the auxiliary elements of the coast defense.
29. What are general defense plans and their uses?
30. Discuss the function of our fleet in connection with coast defense.

LESSON IV.

(Chapter IV.)

COMBINED LAND AND NAVAL ATTACK.

31. Assuming that the invader intends making a combined land and naval attack, what would be the first step?
32. Discuss the landing of troops.
33. Assuming that a landing has been effected, how would the invading force proceed?
34. Upon meeting with the coast guard, what would be the intention of the commander of the invading force?
35. What kind of an attack promises the most decisive results?
36. Supposing all attacks have been successful, and the invader finds himself in front of the land front of the fort, what means are open to him to cause the reduction, the surrender, or the evacuation of the fort?

37. Discuss briefly the question of siege operations, making a sketch giving your idea of "parallels" and "approaches."
38. What is meant by "mining operations" in land warfare, and how are they combated?
39. What is the duty of the defenders as a last resort before surrender or evacuation?
40. How would you destroy a gun or a mortar?

LESSON V.

(Chapter V.)

DEFENSE AGAINST A COMBINED LAND AND NAVAL ATTACK.

41. Classify the defending troops.
42. To which classification does the coast artillery militia pertain?
43. What will be the aim of the coast guard commander when he has determined that the enemy have undertaken a combined land and naval attack?
44. What will be the aim of the coast defense commander under the same conditions?
45. What can you say of the necessity for preventing a landing?
46. What is the strategical principle concerning defensive actions?
47. Discuss the value of aggressive counter-attacks.
48. Discuss the occupation of the final defensive position.
49. What disposition is made of the coast artillery supports?

50. In your opinion, where would troops best be obtained for coast guard and support duty in connection with coast defenses of Puget Sound upon the outbreak of war?

APPENDIX B.

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APPENDIX C.

ATTACK AND DEFENSE OF FORTIFIED HARBORS.

BY

CAPTAIN ARTHUR P. S. HYDE

Coast Artillery Corps.

SERIES OF BOOK REVIEWS.

The articles of Captain Arthur P. S. Hyde, C. A., U. S. A., contributed in a series to the *Seattle (Wash.) Daily Times* at the request of Colonel William E. McClure, commanding the Coast Artillery Corps of Washington, have been published in pamphlet form under the title, "Attack and Defense of Fortified Harbors." Captain Hyde is the inspector-instructor of the Coast Artillery Reserves of Washington, and his pamphlet is now published by the headquarters of the Reserve Corps at Seattle. The general subjects treated are the general principles of coast defense, naval attack, defense against naval attack, combined land and naval attack, and defense against combined land and naval attack.

The author is satisfied with the coast defenses of the country, for he says: "We are exceptionally well defended, so far as the sea fronts are concerned; so well, in fact, that we may safely say it would be impossible for our forts either to be reduced by bombardment by a hostile fleet or rendered untenable, owing to attack by sea alone." However, he finds that "little or nothing has been done in the way of providing land defenses for our forts."

Relative to the efficacy of bombardment, the author says: "Vessels may lie at nearly extreme range and bombard the forts, with a view to disabling guns and fire-control stations and to produce such demoralization among the personnel as may be possible. This method never produces decisive results."

The "run past" form of attack, such as that which made Admiral Farragut prominent, is not feasible to-day, on account of the large cost of a modern battleship and the small return derivable in comparison with the loss of a big ship. Although the only guns less than a hundred years old defending the harbor of Santiago, Cuba, were four or five small-caliber pieces, dismounted from the disused cruiser *Reina Mercedes*, and mounted near Morro Castle, Admiral Sampson did not care to subject his armored ships to the fire of these guns while the Spanish fleet was still afloat. "Every armored ship needlessly lost in war is virtually a gain of two for the enemy."

The latest and best thought in the matter of coast defense involves, wherever practicable, the location of forts on small islands, as offering no chance for land attack. The defenses of Manila Bay show the greatest development of this idea. The splendid location of Fort Flagler on Marrowstone Island has convinced a number of officers that all the defenses of Puget Sound should be concentrated at Flagler. "Unsupported by a land attack, a naval bombardment should not be relied on to effect the reduction, surrender, or evacuation of a fort."

The opinion of the author is that, as battleships are built to fight battleships, they are not the match of adequate coast defenses, and that the only form of attack promising success against coast defenses is a combined land and naval one. In defensive work, the mortar and

the submarine promise the best results against battleships, as the velocity of a mortar projectile is increasing at the moment of impact, and the longer the range the greater the velocity, while with direct-fire guns the velocity of the projectile is decreasing from the moment it leaves the muzzle. Again, the mortar seeks out the lightest armor protection of ships, the decks, while the direct fire aims at the heavily protected sides. From the present tendency toward reduction in the number of different calibers manifest in the Navy and in coast defense, Captain Hyde draws the conclusion that in new fortifications the primary armament should consist of either 12- or 14-inch guns—depending on local conditions; the intermediate armament, of 6-inch, and the secondary armament, of 3-inch. There seems to be little, if any, use for 7-, 8-, and 10-inch guns. The increase of the British dreadnaught guns to 15-inch and the success of the German 42-centimeter (16½-inch) gun indicate the necessity of making the 16-inch gun the standard maximum caliber for coast defense.

Attention is called by the pamphlet to the fact that in France the problem of coast defense is confided to the Navy. A great aid to coast defense would be furnished by submarines. In the most promising form of attack, that by land and sea, the coast guard must consider its first duty to be that of preventing the landing of the land-force of the enemy. This was not done by General Toral when Shafter landed for the investment of Cuba. The latter had only 15,000 men approximately, while there were 36,582 Spanish soldiers and 1,000 sailors landed from Cervera's fleet available for preventing this landing. The plan now under consideration by the War Department for establishing a brigade post on Puget Sound means

much for the proper defense of that district. Captain Hyde's treatment of the question of coast defense is marked by a singularly lucid and instructive method of dressing up otherwise dryly technical data, and is especially valuable for State coast artillerymen.—*Army and Navy Journal*, December 19, 1914.

Attack and Defense of Fortified Harbors.

Captain Arthur P. S. Hyde, C. A. C., inspector-instructor, National Guard of Washington, upon the request of the commanding officer of the Coast Artillery Reserve Corps of the State of Washington, published some interesting articles in a prominent Seattle daily, dealing with the organization and functions of coast artillery, with particular reference to the defense of Puget Sound.

The interest which these articles excited among the officers of the National Guard of Washington, and a desire to make a careful study of the important subject of the attack and defense of fortified harbors, led Captain Hyde to revise the material and publish it in the form of a convenient booklet. As such it has been used as a basis for a correspondence course.

This valuable brochure should prove of great use to coast artillery officers of the National Guard wherever they may be located, and it is of sufficient general interest to make it worth reading by anyone interested in the defense of our coasts.—*Arms and the Man*, December 24, 1914.

Attack and Defense of Fortified Harbors

This is a small pamphlet of twenty-seven pages, in which the author has covered most admirably, for its small compass, an extensive subject.

The pamphlet, as stated in the preface, is a compilation of a series of articles written by the author at the request of Colonel William E. McClure, commanding the Coast Artillery Reserve Corps of the State of Washington, and published in the *Seattle Daily Times* in January and February, 1914. The pamphlet is published as Bulletin No. 3, Headquarters Coast Artillery Reserve Corps, dated Seattle, Washington, November 11, 1914.

The first chapter deals with the general principles of coast defense. The necessity for permanent works and the general policy of the United States as to coast fortification are set forth. A list of the fortified harbors in the United States is given. The general forms of attack to which coast fortifications are subject are given, and from a consideration of these is deduced the general principles governing the selection of the most suitable sites for coast fortifications.

Succeeding chapters discuss the subjects of naval attack, the defense against naval attack, including the organization of the defenses; the submarine and aerial defenses, and the function of the Navy in supplementing the shore defenses; the combined land and naval attack, and the defense against a combined attack. At the end of the book is given a synopsis of a correspondence course

in the subject of "Attack and Defense of Fortified Harbors." This course consists of a series of questions covering the subject-matter of the text.

A bibliography is also given, so that anyone desiring to make a more extended study has at hand a list of excellent reference-books and papers treating of the subject.

Giving, as it does, the general principles of attack and defense of coast fortifications in concrete form, the pamphlet is of great value to the coast artillery reserves or to any person desiring information on the coast artillery branch of our national defense, and who has not the time to give to an extended course of reading.

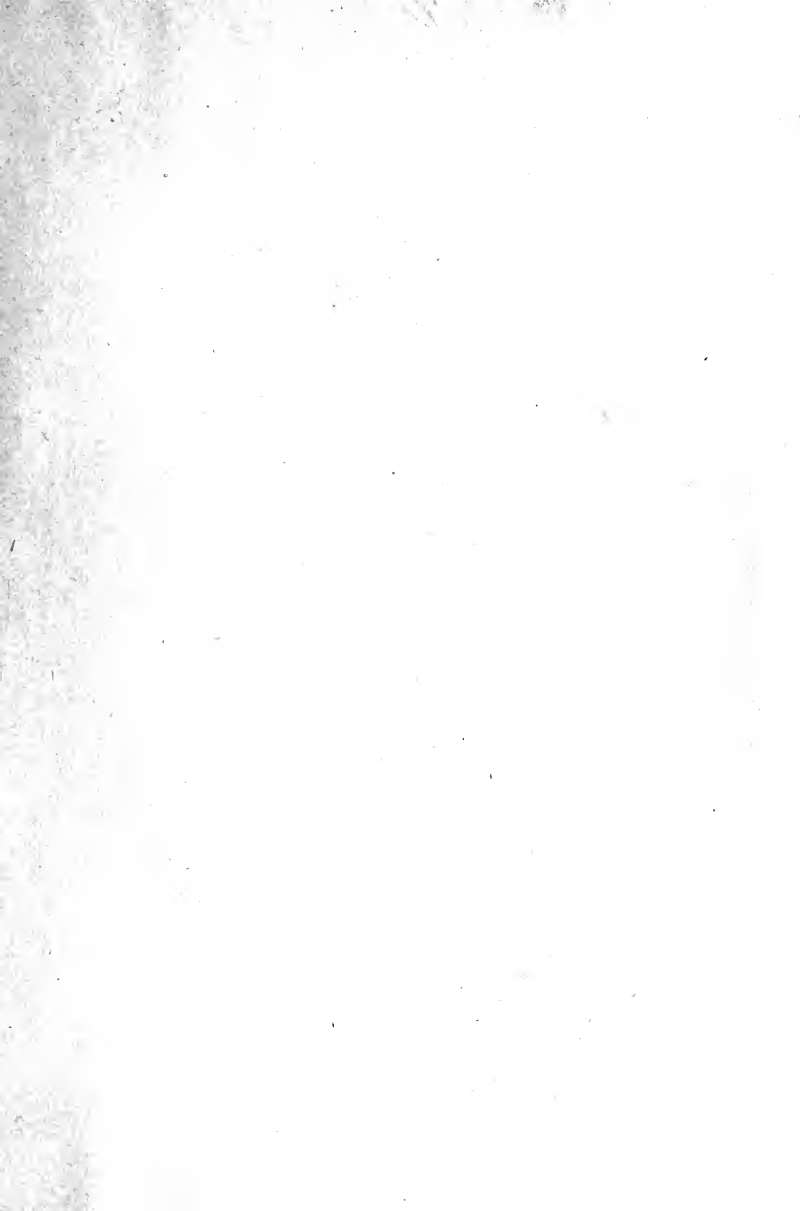
By Captain Arthur P. S. Hyde, C. A. C. 6x9. 27 pages. Illustrated. Paper. 1914.—*Journal of the United States Artillery*, January-February, 1915.

Attack and Defense of Fortified Harbors.

This was originally published as a series of articles in the *Seattle Daily Times*. The author was on duty as instructor of the Coast Artillery Reserve Corps of the National Guard of Washington. He has revised and republished the papers in a short but interesting treatise, in pamphlet form, for the instruction of the officers of that corps.

He has, very naturally, taken the defenses at the entrance to Puget Sound and the surrounding country as the locality for illustrating his principles, and has used the attack on Santiago in 1898 and Farragut's attack on the forts of Mobile Bay as historical examples of different methods of attack.

The paper is of especial interest and value in that it shows the fallacy of a purely naval attack on fortified harbors, and emphasizes the necessity for coöperation between land and naval forces in a joint attack to ensure victory and lasting results.—J. W. W., *U. S. Naval Institute Proceedings*, January-February, 1915.



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